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Heights in Feet. Passes & Principal Railways

CHINESE EMPIRE



THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY.

HIMALAYAN TRADE ROUTES.

(See Map.)

By MR. CLEMENTS R. MARKHAM, C.B., F.R.S., President of the Royal Geographical Society.

[Addressed to the Members, in the Athenæum, Wednesday, October 11th, 1893.]

IT is with no slight pleasure that I find myself addressing the Geographical Society of Manchester, because I have always held that in the great centres of intelligence and enterprise Geography ought to find its most diligent students and exploration its keenest advocates. The success of this Society proves that I was right, and I feel it to be an honour to be invited to address you on such an occasion as the present.

I have thought that one of the geographical subjects which would be calculated to interest you would be the trade routes to and from India, discussed under their geographical aspects. In the course of your session more stirring subjects are brought to your notice by explorers themselves. Still you will, I think, consider it desirable to step aside occasionally from the exciting narratives of personal adventure, to consider and take stock of our knowledge of some special region. The present occasion seems to be suitable for such a pause; and I propose to endeavour, with your consent, to utilise it by discussing the system of the Himalayan ranges which hem in the rich and fertile regions of India, and by considering the extent to which that mountain mass has interfered with commerce or served as a defence against invasion.

The intervention of this mighty barrier has certainly exercised great influence on the history of India, and has been the chief cause that the main channels of trade have, in all ages, been across the sea rather than through the passes of the mountains. The whole subject of trade routes to India, both by sea

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and land, is an extremely fascinating one. Sir George Birdwood has pointed out, truly enough, that the competition for the commerce of India, between the nations of antiquity, beginning with the Egyptians and Phœnicians, is the true key to the history of the successive states and empires that rose and fell as they gained and as they lost the trade of India.

But time will only allow us to glance at the *land* routes for trade, and at the geographical structure of the mountains over which the merchant and the invader must pass who would open *land* communication between the people of India and their Trans-Himalayan neighbours.

We first contemplate the Himalayan Mountains with reference to the effect of their presence on the climate and fertility of the plains which spread out below them. Standing as a mighty rampart around the northern frontier of India, the mountains store up water for the use of the tropical plains. All through the summer enormous quantities of water rise from the Indian Ocean in the form of vapour. The clouds are carried northward by the monsoon, which sets in from the S.W. in the month of June. Some of the moisture falls in rain on the plains, but the rest is borne against the mountains, whose lofty walls stop its further progress. It either falls in rain on the lower slopes, or is frozen into snow in its attempt to cross the higher ridges.

Thus it is that the southern slopes of the Himalayas receive the largest rainfall that is known in the world, and pour it down into the Indian rivers. At a place called Cherra-Punji, where the monsoon first strikes the hills in Assam, 500in. fall every year on an average, and in the year 1861 as many as 800in. were reported—more than half falling in the single month of July. The streams of the three great river systems of the Indus, the Ganges, and the Brahmaputra collect the drainage of the southern slopes of the northern chain of the Himalayas, and convey it, by tortuous routes, through the mountains to the plains of India. The Indus bursts through a gorge which is 1,400ft. in sheer depth. Its great tributary, the Sutlej, passes down a narrower and still more profound abyss. Sometimes most tremendous floods occur in these rivers, caused by the fall of huge masses of rock and earth which block them up, until at length the pent-up waters burst forth with irresistible fury. In 1819 the shoulder of a mountain gave way at Seoni, about 20 miles N.W. of Simla, where the Sutlej flows between perpendicular cliffs. The fallen mass choked the bed for a height of 400ft. The river ceased to flow for 40 days, when it burst the obstruction and rushed down in a mighty wave 100ft. high, carrying ruin and desolation before it, but also sending down fresh soil into the plains. Nature assuredly works on a grand scale in those mountains.

The Ganges issues from an ice cave, at the foot of a Himalayan glacier, 13,800ft. above the sea, and has a course of 1,500 miles, receiving numerous tributaries. It empties itself into the Bay of Bengal by many mouths, forming a vast estuary. One of the mouths is 20 miles wide, with a depth of 30ft. in the dry season, and for a distance of 200 miles the sea face of Bengal entirely consists of estuaries of the Ganges, intersected by low islands and promontories formed out of its silt.

The plains of India owe their existence to the rivers which, in their turn, are created by the snows of the Himalayas. During centuries and centuries those rivers have carried down the earth of the mountains suspended in their water, and have deposited it as they flowed along. They thus created the plains, and they have ever since fertilised them, and have also served as highways of communication along them.

Dashing down from the Himalayas, the numerous streams cut out for themselves deep gullies in the solid rock, and plough up the glens between the mountains. If a man wades across one of these streams his ankles will soon be sore, and he will feel a prickly sensation across his feet. The soreness will be caused by blows from pebbles which are being carried down by the stream, and the prickly feeling by the rushing sand and gravel. This has been going on for untold ages; and in this way the plains of Bahar and Bengal have been formed by the silt washed down from the mountains. When the rivers reach the level country their currents become slower, and they gradually drop their burdens of silt, which eventually raise the beds of the streams until the water spills over the banks and forms new beds. Thus the dry land was gradually raised. Even now there are thousands of square miles in Lower Bengal which, in this way, annually receive a top dressing of new soil, brought free of cost for more than a thousand miles by the river currents.

The Himalaya Mountains, by the agency of their rivers, first—as it were—built up the plains of Bengal, and then continued to fertilise them. It is no wonder that the snowy peaks and the silt-laden rivers are worshipped by the people. It is calculated that the Ganges, at Ghazipur, annually brings down from the mountains 6,368 millions of cubic feet of silt. This would supply 355 million tons a year, or an amount equal in weight to 60 times that of the Great Pyramid. If this was done by human agency it would require 2,000 great ships to sail down the river every day for four months, and to throw overboard 1,400 tons of mud apiece each day. This is impossible; but the operation is tranquilly and almost insensibly performed by the Ganges.

These preliminary reflections on the enormous power that is wielded by the Himalayas for good, in creating and fertilising the plains at their bases, should, I think, engage our attention

before we go on to consider the mountain masses as a barrier. The Himalayan system is composed of three culminating chains, running more or less parallel to each other from the gorge of the Indus to that of the Dihong, a distance of 1,500 miles.

The inner or northern chain, in its western part, is known as the Karakorum range, and separates the basin of the Indus from that of the Yarkand river. It has vast glaciers and lofty peaks, including that known as K 2, which is 28,278ft. above the level of the sea; and it is traversed by passes of great height. Mr. Conway proposes to call K 2 "*The Watch Tower of India*," as it stands on the great rampart that protects the Empire. The sources of three great rivers are on the southern slopes of the northern range—the Indus, Sutlej, and Brahmaputra—which force their way through the central and southern ranges before reaching the plains of India. This northern range forms the northern watershed of the Brahmaputra, throwing up lofty but as yet unmeasured peaks.

Parallel to the northern range runs the central range of the Himalaya, and the two are connected by saddles, notably at the Marian-la Pass, separating the lateral valleys of the Sutlej and Sanpu or Brahmaputra. The central chain forms the southern watershed of those valleys, while on its southern slopes are the sources of many important rivers which, forcing their way through the southern chain, eventually join the Ganges or Brahmaputra. Very magnificent views of the long line of glaciers and snowy peaks along the central chain were enjoyed by Sir Joseph Hooker from the Donkia Pass.

The Southern Himalaya, with its chain of stupendous peaks, rises from the plains of India, the distance from the plains to the culminating ridge averaging 90 miles. At the foot of the mountains there is a belt of fever-haunted forest called the *Terai*, above which is the *Bhabur* or sal forest. A ridge of hills fringes the mountain mass along its whole length, known as the *Sawalakh Hills* to the west, as the *Maris* in Nepal, and the *Duars* in Bhutan. Behind them rises the Himalayan slope, consisting of a perpetual succession of vast ridges with narrow intervening glens—the open valleys, like that of Nepal, being very rare.

In ascending the gorges from the *Terai* to the alpine ridges the traveller passes through three zones of vegetation. In the lower region he finds splendid timber trees, such as the *sal* and *sissa*, banyans and peepuls, bamboos and palms. The central slopes are clothed with oaks and chestnuts, laurels and rhododendrons, ashes and elms; and it is in this zone, below Darjiling, in Sikkim, that the plantations of quinine-yielding chinchona trees, which I introduced from South America, have been formed. The upper zone is that of junipers, larches, and willows; and above it rise the vast glaciers and snowy peaks.

Here the highest mountains in the world tower into the sky: the word Himalaya, as is now well known to geographers, meaning "the abode of snow," from the Sanscrit words *Hima* (snow) and *Alaya* (a house or abode). The height of those Himalayan peaks should never be referred to without a tribute to the surveyors who measured them. When Englishmen first reached the plains of India and gazed on the long line of snowy peaks they were astonished. They looked upon the Himalayas as a confused mass of impenetrable gorges and cliffs, peaks and glaciers, which it would be almost as impossible to explore as to understand. It took more than one generation of students of geography to master the subject. It was the surveyors who first explored and mapped the plains and the recesses of the mountains, and then wrote memoirs and reports, which made the knowledge so painfully and diligently acquired by them the common property of all the world.

James Rennell, who ranks among the most eminent of English geographers, was the Father of Indian Surveys. He became Surveyor-General in 1764, and worked for many years at the enterprise of mapping the plains and river courses of Bengal and Bahar. I have just mentioned the wild forest-covered tracts, called the *Terai* and the *Bhabur*, at the foot of the Himalayas. In the days of Rennell those tracts were frequented by bands of robbers, who periodically issued from them and ravaged the neighbouring plains. Hearing that one of these gangs was robbing the villages near him, Rennell gallantly went in pursuit with his little band of surveyors. Advancing some distance in front of his men, he was suddenly surrounded by the robbers, all armed to the teeth. He had nothing but a sword with which to defend himself, until his own people came to his rescue. But one stroke of a sabre had cut his right shoulder-blade through, and laid open about a foot down his back. On another occasion a large leopard, after disabling two of his men, sprang at him. Rennell received the enraged animal on the point of his bayonet, which he rammed into its wide-open mouth, and thus saved his own life—so that the work of the first pioneer, in surveying the bases of the Himalayas, was not without its dangers.

Rennell had successors who followed his example, and who completed the survey both of the plains of India and of the Himalayas. One of these was George Everest, who joined the Survey Department in 1818. He was a man of great ability, a profound mathematician, and endowed with indomitable energy and perseverance. The whole conception of the trigonometrical survey of India is the creation of his brain, and that survey is unsurpassed in the world for rigid scientific accuracy. Sir George Everest retired in 1843, and died in 1866, and one of the ablest of his disciples was his successor, Sir Andrew Waugh. Among the first labours of the new Surveyor-General

was a survey of the base of the Eastern Himalayas by triangulation, and thence fixing the height of all the peaks that were visible. This memorable undertaking was begun in the year 1845 and completed in 1850. It was a most arduous and perilous task. In one season 40 natives died of jungle fever. In 1847 the whole surveying party was struck down by disease, and two of the officers died. Still the rest persevered, and the battle with nature was won.

The mightiest peaks of the Himalayas are visible from the principal trigonometrical stations in the plains. They were fixed by measurements with a large theodolite. The great difficulty of the computer was the identification of numerous points, the positions of which had been observed by different persons from different points of view. The triangles were projected on a large scale, and the rays emanating from the observing stations were exactly drawn. Their intersection defined the points sought for. The area of the largest triangle to a Himalayan peak is 1,706 square miles, with one side 151 miles long. The heights of 79 peaks were thus fixed, of which 31 have native names, and the rest are numbered. Their positions are minutely accurate, and the calculated heights are probably true to within 10ft., all being too low if anything, owing to deflection due to mountain refraction. No. 15 was the highest peak, being 29,002ft. above the sea. In 1852 it was named, by Sir Andrew Waugh, after his old chief who planned the measurement, Mount Everest.

The dangers and difficulties in the execution of these measurements was as great as those encountered in the majority of Indian campaigns. Military service is plentifully rewarded by the praise of men and by honours and prizes of all kinds; while the surveyor devotes great talent and ability to scientific work in the midst of as deadly peril as is met with on the field of battle, with no prospect of reaping the reward that he deserves. Yet his labours are of permanent and lasting value. Few, however, know the names of those who obtained these valuable results, besides the devoted surveyor's immediate chief and colleagues; but their gallant services ought to be held in memory by geographers who benefit by them. The North-East Himalayan series was one of the most desperate among the heroic enterprises of Indian surveyors, and the average of deaths was higher than in many famous battles.

In the Western Himalayas similar noble work has been done. The Kashmir series was completed in 1864, consisting of a surveyed area of 70,000 square miles, in every variety of climate and scenery. There is scarcely a valley in those wild regions of perpetual snow that was not visited by the surveyors, and peaks were fixed, some of which (among them that known as K 2) are second only to Mount Everest in height.

India is not only closed in to the north by the main chain

of the Himalayas, but it is also bounded by mountain chains to the west. The Hindu Kush, commencing at the south-west corner of the Pamir plateau, and bounding the Kabul valley to the north, ends where the Koh-i-Baba and Paghman mountains branch to the south-west and south, a distance of 300 miles. It is a continuation of the Himalayas, almost rivalling them in height, some of its peaks attaining a height of 20,000ft. Sir Henry Yule has pointed out that it is a very distinctly defined chain, the line of loftiest peaks coinciding with the line of passes. It forms the water-parting of the Indus and the Oxus, and is thus the crest or parapet of the Indian fortress in this direction. On the southern slopes of the Hindu Kush are the Chitral valley, whence lofty passes lead to the elevated plateau of Wakhan, the almost unknown but most interesting region of Kafirstan and the Kohistan of Kabul, where the streams unite to form the Kabul river. The passes are often covered with rich pasture and form grazing grounds in summer, but they are closed by snow for more than half the year. The Kunar river flows down a valley which is parallel with the line of the Hindu Kush mountains, but it has only been partially explored, the whole length of its course until it falls into the Kabul river being 97 miles. The western section of the Hindu Kush is the Indian Caucasus of the historians of Alexander the Great's campaigns; and at its base is the country called Koh-i-Daman, or "skirt of the hills," a region of great beauty and fertility.

In the eastern corner of the bounding hills is the famous "*Reig Rowan*," or moving sand. Abul Fazl, the famous minister of the Emperor Akbar, in his "*Ayin Akbari*," says that in this sandy desert the sound of drums and kettle-drums is heard in summer; and that the natives ascribe to the sand-hills the utterance of strange unearthly sounds. This led Lieutenant Wood, of the Indian Navy, the discoverer of the source of the Oxus, to visit the spot. He found the moving sand stretching up the side of the rocks for 250 yards, with a base of 100 yards wide, and an acclivity of 40°. He heard the sounds, like a drum mellowed by softer music, and discovered that it was caused by the fall of particles of sand into hollows. The rustle of the dry sand was condensed and reverberated by the circular conformation of the rocks around. I have heard similar music in the deserts of Peru at early dawn, after sleeping at the foot of one of the half-moon shaped sand-hills called *medanos*. The Koh-i-Daman is a position of great strategic importance, for it commands the outlets of all the western Hindu Kush-passes.

The lofty range of the Safid-Koh shoots off from the Hindu Kush, the River Kabul washing its northern base, and its long parallel spurs extending to the Indus. From its southern face, a system of mountains with parallel ridges and many spurs—called the Sulimani range—extends in one continuous line to

the Arabian Sea, and forms the north-western boundary of India. At the junction of the Sulimani range with the Safid-Koh there is a drainage system with streams converging to the Kurram, a river flowing across the Bannu district to the Indus, and up this valley the Kurram Pass leads into Afghanistan. The Khaibar Pass is on the northern side of the Safid-Koh; and south of Kurram is the Khost valley. Between Kurram and the peak of Takt-i-Suliman the mountains are included in the Waziristan country, which was explored and ably described by Colonel Walker in 1860. The peak of Takt-i-Suliman is 11,300ft. above the sea; and in the Waziri country to the north the Pirghul peak rises to 11,580ft. Further south are the Gomul Pass, leading from Ghazni to the Indus; the Bolan, and many others; and the range, hitherto known as Sulimani, is called the Hala Mountains from the Bolan Pass to the sea at Cape Monze.

We have now made a very hasty survey of the mountains, and we find that India, on the land side, is entirely enclosed by them from the Arabian Sea to the Bay of Bengal. The trade routes by land must of necessity be over the mountain passes, and armies of invasion are equally obliged to use those perilous and difficult lines of road.

Yet nothing is more certain than that, if an enlightened policy were adopted and an understanding established between the Tibetan and British Governments, an immense trade might be established by the passes over the Himalayas, between Sikkim and Bhutan on the one side and Tibet on the other. Even now traders bring their merchandise to Lhasa, the capital of Tibet, from far and near—not only from China and Mongolia, but also from the Indian provinces of Bhutan, Sikkim, and Kashmir—rice, tobacco, broad cloth, silk, indigo, coral, pearls, sugar, spices, and Indian manufactures. Even now English woollen cloths are much prized, and the French missionary, Desgodins, 15 years ago, saw a vast number of bales of cloth, marked "Halifax," on their way to a place in a distant part of Tibet. The demand for tea in Tibet is enormous, but it now all comes from China. The exports from Tibet are gold, salt, sheep's wool, furs, musk, yaks' tails, borax, and ponies. Darjiling is the central mart for the Chumbi valley route, Patna for that passing through Nepal, and Kashmir for the long route by the Mariam-la Pass.

The great staple of Tibet is its wool, which can be produced on its vast plains and mountain slopes in any quantity and of the finest quality. A good frontier road might be made from Darjiling; but many other passes would be used if the trade were once opened, and the trade routes across the difficult Himalayan passes into Tibet would at length become important. The promotion of this traffic between Tibet and India was one of the

features in the policy of Warren Hastings, the greatest of our Governors of India. He applied himself to the adoption of the wisest measures for securing this end. He maintained continuous interchanges of good offices by correspondence with the Tibetan authorities, and by despatching missions. He also took steps to secure the goodwill of the Chinese Government. No mission has been sent to Tibet since his time, no effectual measurers have been adopted to open the trade. I well remember, in the days of the cotton famine, with what zeal and energy the men of Manchester enforced on the Government the necessity of active measures for the increased and improved cultivation of cotton in India, and with what success their efforts were attended. If the same powerful influence were again exerted to induce the Government to follow in the footsteps of Warren Hastings, and open the passes into Tibet for unrestricted commerce, I have no doubt whatever that similar success would follow.

China has promised to take measures to promote trade between India and Tibet, and all classes in Tibet are in favour of unrestricted commerce except the Kalu faction of monks, who want to preserve their monopoly of trade to Sikkim, and fear that intercourse with foreigners might impair their ascendancy over the people. But Mr. Colman Macaulay's intended mission in 1886 would have been perfectly successful, and a commercial treaty would have been signed, if it had not been for that official obstruction which can always be removed by the pressure of instructed public opinion. That, unfortunately, was wanting. Meanwhile, in spite of all obstacles, trade is increasing. When those obstacles are removed it will increase enormously—wool, gold, and yak's hair being exchanged for European manufactured goods. If a regular system were established, wool, unsurpassed in the world, could be sold at Darjiling for 12 rupees per maund, and at these prices there would be an unlimited demand for properly cleaned Tibetan wool in the European markets. It is by promoting exploration and discovery with such a definite and useful purpose as the opening of free trade between India and Tibet that Geographical Societies can do such important service. They may thus forward the adoption of a broadly-conceived and continuous policy for the establishment of unfettered intercourse through all the Himalayan passes. The first essential for the initiation of such a policy is a comprehension of the physical and political geography of the region, and a thorough knowledge of its history.

Passing westward along the Himalayan Mountains from Sikkim and its passes into Tibet, the next country is Nepal, which is independent and, therefore, unsurveyed and little known, though an English resident resides at Khatmandu, the capital. We know, however, that there are trade routes over

the Nepalese passes, and also that they have been used for military purposes. In 1792 a Ghurka army, 18,000 strong, crossed the Himalayas by a difficult pass, with great rapidity, and took the town and palace of Teshu Lumbo, the residence of one of the sacred Lamas of Tibet. The Chinese Government came to the rescue, and their demand for reparation from the Ghurkas of Nepal having been met with insolent defiance, a Chinese army, 70,000 strong, with the necessary stores, was despatched. The Ghurkas were defeated in two battles, and the Chinese army marched down into Nepal. After another defeat the Nepal Government sued for peace, which was granted on very humiliating conditions. The Chinese then returned by the Kirong and Arun Passes. We thus see that an invading army may enter India by the Nepal passes, which must, therefore, be adapted for trade routes. It is a fact that the Tibetan Government has always been in a chronic state of fear of invasions by the warlike Ghurkas through the passes of Nepal. A guarantee from the Government of India that no such invasions will be permitted, and that the Nepal passes shall only be used for trade, would be one of the inducements that we could hold out to the Tibetans to open their passes to unrestricted commerce.

Further west, in the passes of the Karakorum range, the difficulties in establishing and maintaining trade routes are much greater, owing both to want of supplies and to the poverty of the provinces of Yarkand and Kashgar, where alone markets could be found. The cart road from Peking to Kashgar, which has recently been described by Colonel Bell, is 3,500 miles long; so that, although the passage across the Karakorum range is perilous and difficult, the greater proximity of Kashgar to the Indian markets would be a great advantage if the English showed energy and enterprise. But in these qualities they are outdone by the Russian merchants, who flood Kashgaria with their goods. Sir Douglas Forsyth, indeed, told me that when he conducted a mission to Yarkand and Kashgar in 1873, he saw bales of English goods, but they had passed through Russia and were also marked by a Russian firm. They merely represented an order which could not be completed in Russia. Colonel Bell heard that there were about 15,000 souls in Western Turkistan who looked to England for help in their commercial pursuits, consisting of Kashmiris, Pathans, and Hindustanis. He was of opinion, after visiting the country, that there were many advantages to be gained by organising the oriental trading material at our command in Western Turkistan. Enterprising Kashmiris are found there in large numbers, as well as in Nepal and Tibet, and they carry on trade with India. There are also Hindus and Pathans. By associating these scattered elements with large Indian and Parsee firms much good might be effected, in spite of the difficulties of the trade routes.

There are traditions of the former existence of several ancient passes from Kashmir, across the lofty ridges to Yarkand, which are supposed to have since become impassable owing to accumulations of snow. These were the Nushik-la, the Hispar Pass, the Mustagh, the Salton, and the Karakorum. The Mustagh Pass was crossed by Captain Younghusband in 1887. Last year Mr. Conway and his party explored the Nushik-la and the Hispar Passes. Mr. Conway gives some striking descriptions of the mud avalanches which rush down the gullies in those lofty regions, and have a most important influence on the physical changes that take place. "Just as we reached the brink of a gully," he writes, "we heard a sound like thunder, and saw, advancing downwards at a great rate, a huge black volume of mingled mud, water, and rocks, which filled the whole gully, and was making for the river below. The rocks that formed the vanguard of this hideous thing were many of them 10ft. cubes, and they were rolled round and round by the mud as though they had been pebbles." Three times did the mountains disgorge their mud avalanches before Mr. Conway was able to seize a favourable moment to cross the gully. Farther on the Hispar valley was found to be filled with one vast glacier, while an avenue of mighty peaks walled the glacier in on either hand. The pass is 80 miles in length, and is the longest glacier pass in the world. It had not been crossed before in the memory of any living man; and tradition only relates a solitary raid over it by a band of robbers.

The Karakorum Pass, the one now used, is at an elevation of 18,000ft. above the sea, the route leading over a cold and desolate region devoid of all supplies. It must certainly be acknowledged that the stupendous obstacles offered by nature make it difficult, if not impracticable, to establish a trade route here of more than the most moderate dimensions. At all events the obstacles have hitherto been too great for British enterprise to encounter and overcome. The solitary exception was the late Mr. Dalgleish, whose name stood high among all classes in Turkistan. But most unfortunately he was murdered on this forbidding road, between Leh and Yarkand. His fate *may* deter others for a time. But Mr. Conway has since shown that Englishmen are not to be daunted, and this opening for commerce, terrible and threatening though it be, ought not to be permanently abandoned, with the result that the markets of Eastern Turkistan will become the undisputed property of the Russians.

The passes of the Hindu Kush, although they are sealed up by snow for half the year, have not formed a complete barrier to invasion. Some of them are, however, guarded by an indomitable race of unconquered hillmen, called by their Muhammadan neighbours Siah-posh—(black clothed) Kafirs. Their country consists of the long valleys extending from the Hindu

Kush ridges to the Kunar river. They have flocks and herds, raise corn, and make a strong and heady wine. The Kafirs are described as strong, athletic men, with a language of their own, features and complexions of Europeans, and they are fond of dancing, hunting, and drinking. They sit on chairs, play at leap frog, and shake hands like Englishmen. When a deputation of Kafirs came to Sir William Macnaghten, at Jalalabad, the Afghans exclaimed, "Here are your relations coming!" We have had accounts of the Kafirs from Mr. McNair and Sir William Lockhart, but their country was quite unknown until it was visited a few years ago by Dr. Robertson. The Siah-posh Kafirs have never been conquered, and they would form, in their inaccessible valleys, an admirable outpost of our Indian Empire, so that the establishment of friendly intercourse with them is much to be desired. Here would be a market for British goods, as well as a defensive post against Britain's enemies. On their western frontier is the Khawak Pass, 13,200ft. high, leading over the Hindu Kush to Badakshan, one of the lowest and most accessible of the Hindu Kush passes. It was probably used by Alexander the Great on his march from Bactria; and it was certainly the route taken by the Chinese Pilgrim, Hiouen Tshang, in A.D. 644, who wrote one of the earliest accounts of India. Timour also used it in 1398, and Lieutenant Wood, I.N., traversed it on his way to discover the source of the Oxus. But it is very improbable that a modern Russian army would ever attempt an invasion of India by any of the Hindu Kush passes, which are closed by snow for six months in the year. If it did, there is no likelihood that it would ever return.

The Kushan Pass, a long defile with a gradual and easy ascent to a summit 15,000ft. above the sea, in the western part of the Hindu Kush, is also closed by snow from November to June; and still further west is the Char-darya Pass, used by caravans, and practicable for artillery. This was the pass, then called Kipchak, by which the future Emperor Baber first crossed the Hindu Kush in 1504, and after passing which he first beheld the star *Canopus*. "Till then," says that most charming of memoir writers, "I had never seen the star *Soheil*" (*Canopus*), "but on reaching the top of the pass *Soheil* appeared below, bright, to the south."

The Khaibar Pass, to the north of the Safid-Koh, and leading to Peshawur, is the defile by which Alexander the Great, Mahmud of Ghazni, Baber more than once, and Nadir Shah entered India as conquerors; and to every invader the Afridi mountaineers gave serious trouble, if they were not bought off. By this perilous road came Benedek Goes in mediæval times. In 1839 it first became the scene of operations of British troops, and during the next three years several fierce engagements

were fought in it. The Khaiḅar has always been a trade route, but a dangerous one.

The Sulimani Mountains, forming the western barrier of India, contain passes which have been used from time immemorial by merchants and invading armies. The Kurram Pass is a direct route from Bannu in the Indus valley to Ghazni in Afghanistan, and has been looked upon as one of the most important routes across the Sulimani range for centuries. It certainly was so in the days of Muhammad Ghorī early in the thirteenth century, and it was down the Kurram Pass that Chingiz Khan, the desolating conqueror, hunted the gallant Prince of Kharism. We also have a full account of the advance of Timour into India by the Kurram valley, in September, 1398, and of his return, in March, 1399, by the same pass. It was surveyed by the expedition under General Chamberlain in 1856, and by the Lumsdens in 1858, when proceeding on their mission to Kandahar.

Further south the Gomul Pass is, in several respects, the most interesting in the whole range, for it has been the main trade route between India and Afghanistan during several centuries. The trading tribe of the Afghans, called *Povindahs*, say that they have been merchants since the days of Muhammad of Ghazni 800 years ago, and that from that time they have annually passed up and down the Gomul, in the face of extraordinary difficulties. Just as they may be found now encamped on the Derajat plain, near the Indus, ready to ascend the pass with their Indian merchandise—so the Emperor Baber found them and plundered their caravan during his famous raid, in January, 1505. But their great danger is not on the plains but in the pass, where the predatory mountaineers, called Mahsud Waziris, watch every opportunity to attack and rob them. The story of the Povindahs is really most interesting.

In the summer the Povindahs are encamped in tents on the plains round Ghazni, in Afghanistan, where they pay rent to the Amir for grazing rights. The women and children, with a sufficient guard, remain at the encampment while the men are away trading at Kabul and Herat, and as far as Samarkand. In the autumn they all assemble to form the Indian *kafila*, or caravan. The tents are stowed away in a friendly fort, and the whole tribe—men, women, and children—begin their perilous journey down the Gomul Pass to the plain of the Indus. They have to fight the Waziri robbers as they march, and each night form a bivouac round their baggage. Lieutenant Broadfoot accompanied a Povindah caravan down the Gomul Pass in the autumn of 1839. The camels were not led in strings, but were driven separately with horsemen in front and rear. The young men, well armed, scoured the hills on either side in search of hares and deer, and as flanking parties. On arriving at a

camping ground the women help to unload, the girls draw water, the men graze the camels, and sentries are posted.

The Povindahs bring down to India the fruits from the rich orchards of Afghanistan, such as grapes, pears, apricots, almonds, figs and walnuts, together with dried roses, saffron, jujuba, rhubarb, madder, silks, cloths, druggets, saddlery, horses, dogs, and cats. On arriving in the Derajat, near the banks of the Indus, they pitch their second set of tents, and the men go off with their merchandise to Lahore, Benares, and other parts of India. In April the Povindahs assemble again, for their return journey, taking back European and Indian goods, spices, sugar, tea, guns, pistols, and hardware. The well-known traveller, Mr. Vigne, once accompanied the Povindahs up the Gornul Pass, joining their camp on the Indus before the merchants had returned. The families were waiting for them: the little boys amusing themselves with pellet toys, and bringing down the birds with sure aim. Young girls were swinging merrily, children splashed and dabbled in the stream, and donkeys chased each other about to the great discomfiture of tent ropes. It was a scene of careless ease. Occasionally a string of camels, or a single horseman, came into camp. At last the fathers of families arrived with their merchandise, and the caravan prepared to start.

The Povindahs went up the pass in three divisions, at intervals of about ten days. The children's hair was braided with gold coins, and the women wore massive ear-rings. Young brides were carried on rich cushions of silk on the backs of camels hung with tassels and ornamented with fringes and cowry shells. Older ladies were balanced against each other in baskets. The cavaliers, on handsome horses with gay trappings, pranced by the sides of their ladies. So the great caravan moved up the pass, where serious work had to be done. On the third halt two men were murdered, while asleep, by the Waziri robbers. Two days afterwards there was a fight in a narrow gorge, when five men were killed and two wounded. Shortly afterwards three of the rearguard fell victims; and so the merchants fought their way up the pass. At several points on the road there are graveyards of the soldier-merchants. Just before the last ascent, one division took a route to the south, which led to Kandahar in ten marches. The rest went over the crest, and reached a plain where wild thyme scented the cool air. Sand grouse and antelope here afforded excellent sport, and the country was dotted with mud forts and walled gardens of mulberries and apricots. They had once more reached the neighbourhood of Ghazni.

I have been thus particular in collecting this account of the Povindahs from the narratives of Broadfoot and Vigne, because it gives such a graphic picture of the perilous life of an Afghan

merchant, and of the ways in which commercial intercourse has been maintained, in the face of daily perils and difficulties, between India and the countries beyond the mountains, for a long course of centuries.

South of the Gomul there are numerous passes, some of them very easy. The Sanghar Pass is the best and most direct route from Multan to Kandahar. In 1653 it was used by Prince Dara, son of the Emperor Shah Jehan, when he marched with a large army, including ten guns of heavy calibre, to besiege Kandahar. It has recently been carefully examined, and a good survey has also been made of the neighbouring Zhob valley. The Bolan Pass, in the Hala range separating Sind from Baluchistan, and inhabited by Baluch tribes, is 500 miles south of the Khaibar. The pass is 60 miles long, and its crest is only 5,500ft. above the sea, the road leading thence to Quettah. Ahmed Shah Durani marched down the Bolan Pass more than once, when he invaded India, and it has always been a trade route. In 1839 the Bengal and Bombay columns traversed it with heavy artillery, on the way to Kandahar, taking up 8in. mortars, 24-pounder howitzers, and 18-pounder guns. As the Povindahs are attacked and plundered by the Waziris in the Gomul, so the Baluch merchants used to suffer in the Bolan Pass from the onslaughts of the Mari and other robbers. There is also danger from the Bolan torrent, which rises very suddenly. In 1841 a detachment of Bengal Sepoys was overtaken by a sudden flood in the narrow gorge, and lost with its baggage. There are ten other passes, in an extent of 60 miles, from the plains of the Indus to Baluchistan, the principal one being the Mula Pass, leading from Kotri to Kalat. From the Mula the Hala Mountains run southwards to Cape Monze, a distance of 200 miles. As they approach the sea the hills gradually lose their elevation, and Cape Monze itself, though a prominent headland, is of moderate height.

Our review of the nature of the trade routes across the Himalaya and Sulimani Mountains must impress us with the extraordinary difficulties that are encountered and overcome by the merchants. For decades of years, probably for centuries, the Kashmiris and Hindus trading to Tibet, most of whom are little more than pedlars with no resources, have carried their goods over the snowy passes and along hundreds of miles of desolate country where no food or shelter can be obtained. The ebb and flow of commerce, though very slight, almost to be compared sometimes to a Mediterranean tide, has never ceased. In Tibet itself merchandise is carried on the backs of sheep, and throughout the mountains the means of conveyance are of the most primitive kind. Then there is the constant danger from robbers, most of the passes being more or less infested by predatory tribes. It is surprising that any trade should exist at all in

the face of such obstacles; and it is a reproach to our hundred years of rule in India that the obstacles, which are all easily removable, should be suffered to continue. Warren Hastings saw the importance to India of opening unrestricted trade across the mountains, and he adopted the right way of establishing it. But there has never been any continuity in our Indian policy. In 1886, after the lapse of a hundred years, Mr. Colman Macaulay became thoroughly imbued with the views of the great Governor General, and advocated a resumption of his policy with zeal and ability. He was even appointed to lead a mission into Tibet. But at the last moment the obstructives, who always form so strong an element in government departments, prevailed. The scheme, which had been carefully matured and which was so full of promise, came to nothing, and all Mr. Colman Macaulay's work will have to be done over again.

The same conditions exist with regard to Eastern Turkistan. The trade route over the Karakorum passes presents even greater difficulties than that from Sikkim to Tibet; while the districts of Yarkand, Kashgar, and Khotan are poorer and less able to furnish products in exchange for Indian and English merchandise. Yet even along this terrible route some trade exists; and by gathering together all its scattered elements, giving them systematic organisation and the means of obtaining credit, a profitable intercourse could be established which would be productive of incalculable good to the wild countries through which the trade route passes.

The fostering care of the Government ought to be steadily and continuously extended to the gallant Pöwindahs who use the Gomul Pass as their trade route, and to all traders from Afghanistan. Their position is much less precarious now than it was formerly; and help from some of the great commercial houses would establish the trade in this direction on a still firmer footing. For, difficult as the passage over the mountains must always be, the Himalayan trade routes offer the way to a lucrative commerce between India and the countries beyond its borders—Tibet, Central Asia, and Afghanistan.

A great benefit has been conferred on the mountaineers of the Himalayas and Tibet already, through their intercourse with the British people, by the introduction of useful foreign plants. The potato has been brought from South America and has become an important article of food, not only in the Himalayas, but also in the neighbourhood of Lhasa. Its introduction into Tibet is due to the benevolent forethought of Warren Hastings, who instructed his envoy, George Bogle, to plant potatoes wherever he stopped, both in Bhutan and Tibet. I have myself introduced the maize of Cuzco into Kashmir with satisfactory results, and it now flourishes in the Western Himalayas at heights from 4,000 to 8,000ft. above the sea, especially at

Ranikhet. It is five times as prolific as ordinary Indian corn; and the stalks, producing sugar, are very valuable as food for cattle. I have also introduced the *quinua* of Peru into the Himalayas, because it is cultivated at very great elevations in the Andes, and yields abundantly a small but nutritious grain. There is a plant called *bathu* in the Punjab, which resembles *quinua*, but it is very inferior to it and grows on the plains—not in the mountains. *Quinua* flourishes at elevations of 12,000 to 16,000ft. above the level of the sea, and supplies of wholesome food will thus be provided on the trade routes, at elevations where corn will not ripen. Twenty years ago I sent two cwts. of *quinua* seeds to India, and subsequently large supplies of Cuzco maize; so that the potato, the Cuzco maize, and the *quinua* plant have already been added to the food resources of the Himalayas.

In the course of the remarks that I have offered for your consideration I have alluded to the routes taken by the invaders of India from Alexander the Great to Ahmed Shah Durani. These routes are interesting, because they are trade routes, so that the course of history becomes useful in studying the geographical aspects of the mountain barrier. The character of these passes, and the reasons for their selection by successive invaders, are most important elements in the study of political questions, and thus a knowledge of geography becomes an essential qualification for those who are entrusted with the government of a country. Strategic mistakes leading to disaster in the past, and the injury to trade due to the neglect of routes and of measures for promoting unfettered intercourse, are generally due to ignorance of geography.

Before concluding, I should like to address a few words to any of my hearers who may be engaged in teaching geography with regard to the graphic illustration of physical facts which are necessary to be learnt. The enumeration of the names of passes across the mountains will fail to interest a pupil, and to secure this end I think that even more is needed than a description of their physical aspects. There should be something appealing to the learner's imagination, to fix the facts permanently in his memory. Such an appeal may be secured by an account of the famous men who, as invaders or conquerors, have used those passes, of their resources, their objects, and their fate. By the use of this method of illustration the pupil's mind would be filled with the events which took place in the locality of which he has to learn. His imagination would be aroused, and by this means the facts would be firmly impressed on his memory. Anecdotes and incidents culled from the charming memoirs of Baber, or from the historians of Timour and Nadir Shah, would give life and colouring to geographical descriptions of the Khaibar, the Kurrum, the Gomul, and the other passes over

the mountains. This was the method, as I have been told, which was used by Dr. Vincent, the Dean of Westminster, and the most successful teacher of geography in the last century; and it is a method which I would venture to urge upon those who are now occupied in teaching the elements of our science.

The Society which I have had the honour of addressing to-night is itself a great teaching medium. It can be of immense use in furthering the study of geography in the educational establishments which come within the sphere of its influence, and in creating an interest in our objects. But I firmly believe that it can also be of incalculable service in guiding public opinion in the interests of geography. Wherever trade and commerce find new markets, there geography adds to its store of knowledge. In a great centre of commercial activity like Manchester attention should, as opportunity offers, be drawn to the Himalayan trade routes and to the importance of unfettered intercourse between India and the regions beyond the mountains. I wish also to refer, in a few—a very few—words to another part of the world. I believe that there will shortly be a meeting in this city at which Mr. Robinson will deliver an address on the subject of the Hausa Association. I would very strongly recommend the members of this Society to give their attention to what Mr. Robinson will have to say, because the Hausa Association, for exploring and civilising one of the most interesting parts of Africa, represents a scheme which has been well thought out, is influentially supported, and will ensure very important geographical and commercial results. It is just one of those enterprises to which the Manchester Geographical Society should give the whole weight of its support and its influence!

It is only by thus arousing public opinion, and by bringing continuous pressure on those who have the power and the means of action, that any good is ever done. A Geographical Society, especially a Geographical Society at Manchester, should be a great and powerful instrument in forming and guiding enlightened public opinion. Feeling this strongly, and being convinced that you are already doing good and useful work, and that you have the power and opportunity to do much more, I wish, with all my heart, success and prosperity to the Manchester Geographical Society.



Map of the region of the River of the South, showing the course of the river and the settlements along its banks.

JOURNEYINGS IN THE PAMIRS AND CENTRAL ASIA.

(See Map.)

BY THE RIGHT HONOURABLE THE EARL OF DUNMORE.

[Addressed to the Members in the Athenæum, Tuesday, November 7th, 1893.]

AS time will not permit me to give you a detailed description of the whole of my expedition into Central Asia from start to finish, I propose to-night only to read to you a paper touching upon those parts of Central Asia which are least known to geographers and travellers. To embody in a lecture of an hour and a half even a description of an expedition which covered over 9,000 miles, and took over a year to travel, would be absolutely impossible. I shall, therefore, this evening touch very briefly on my journey from India through Kashmir into West Tibet, and content myself by telling you that I landed at Karachi, February, 1892, and proceeded up country, via Mulan, Lahore, and Jhelum, to Rawal Pindi in the Punjab, where I commenced making preparations for an expedition to the Pamirs and other parts of Central Asia, by way of Kashmir and Western Tibet, and over the great mountain ranges of the Eastern Himalayas and Mustagh, or Ice Mountains into Chinese Turkistan. Passing through Murree, the great hill station of the Punjab, I reached Kashmir in April, where I remained a little while waiting for my permit to arrive from Pekin to enable me to cross the Chinese frontier.

Having fitted out a caravan of sixteen men and twenty horses I started alone, crossing the West Himalayan range by the Zojila, Namik-la and Fotu-la Passes, and struck the Indus at the fort of Khalsi. Crossing the river I rode over the stony wilderness that lies between it and Leh, the capital of Western Tibet, called by the natives Ladak, which place I reached at the end of May. It was there I was joined by Major Roche of the 3rd Dragoon Guards, who had obtained a year's leave to join my expedition, but although he had a permit from the Government at Pekin to cross the Chinese frontier, he unfortunately was not able to procure one from St. Petersburg to enter Russian Turkestan. The first thing we did at Leh was to get rid of all the horses and men we had hired in Srinagar, and to dismiss all our Indian and Kashmir followers, with the excep-

tion of a couple of Shikaris and one Sikh, and then to fit out a fresh caravan. We purchased fifty-six strong wiry little Ladaki horses and engaged thirty picked men (Argoons), all old hands, some of whom, in addition to being first-class caravan men, combined also the various trades of shoeing smiths, pack-saddle makers, shoemakers, durzis, &c.

Of the fifty-six ponies twenty-eight were destined to carry the camp equipage, such as tents, stores, arms and ammunition, photographic and scientific instruments, carpenters and navvies' tools, as well as five hundred spare horse-shoes and three thousand nails. Eighteen ponies were told off to carry corn for the fifty-six, and four were to be loaded with fuel, as there is neither grass nor wood between the Nubra Valley and the Chinese frontier, and the remaining six were to serve as riding ponies for Major Roche and myself, and for Ahmed Din, the interpreter, attached to the expedition by the Indian Government.

During the three weeks we were fitting out in Leh, Major Roche and I visited the Buddhist monasteries of Spittuk and Hemis, the latter being the richest and largest in Western Tibet. We spent two days at Hemis, and were accorded the rare privilege of seeing and conversing with the incarnation, who is a boy of eight years of age.

Our caravan being fully equipped, horses properly shod, &c., we marched out of Leh in June, rather an imposing company, as we had requisitioned seventy yaks to accompany us over the Kardung Pass, the gate of the Eastern Himalayas, that pass being impracticable for laden ponies.

The order of procedure was as follows: Thirty-five yaks carried the baggage; thirty-two preceded them in single file to tread down a track in the snow over the summit; the remaining three we rode. As we also drove a flock of mountain sheep with us for killing, the number of live animals that accompanied us amounted to over one hundred and fifty.

At the summit, eighteen thousand feet above the sea level, we suffered a little from the rarefaction of the air, and more especially when we made the descent on the north side down the glacier on foot. After marching for two or three days through a wild but gloriously beautiful country we struck the Shyok river across which we had to swim the ponies. Thence for five days through an even grander but more sterile country, broken here and there, wherever the natives could obtain water for purposes of irrigation, by patches of cultivation and fruit orchards which surrounded small villages, the inhabitants of which were very well disposed towards us. In the early days of July we quitted the lovely Nubra Valley with its shady groves of apricot trees and hedges of wild roses, and leaving all vegetation behind us, crossed the Leshkya-la, a pass of only

15,730ft., but yet so steep that again the loads had to be carried by yaks. Descending this pass on foot we struck the Tutialak river, and found ourselves in a wild and totally uninhabited region of snow and ice, through which we had to struggle for nearly three weeks before again setting eyes on any vegetation, or on a human being. Following up the side of the river we rapidly ascended and camped that night under a huge glacier at an elevation of 15,250ft., and the following day we rode and walked across frozen rivers and passed a chain of frozen lakes, where our progress was arrested for some time by a newly-fallen avalanche of snow and rock.

That night we camped at an altitude of 17,180ft. on the banks of a frozen lake, and as it was our first experience of trying to sleep at such a high elevation we found it difficult to breathe and impossible to lie down.

The following day we made the passage of the Great Sassir Glacier, about five miles long, on foot, starting at 5 a.m. and arriving on the other side at 4 p.m.; eleven weary hours, a great part of the time up to our knees in fresh snow. It was a trying day for both man and beast, with a burning July sun beating down upon our heads, the glare from which off the snow nearly blinded us, even through tinted snow spectacles. In addition to this was a piercing icy wind off the surrounding glaciers that threatened to cut our already cracked faces to bits; and while our heads were burning, our feet and legs were frozen. I found it very difficult to proceed more than twenty yards at a time without sitting down in the snow to regain my breath, as respiration was difficult at such an altitude as 18,380ft. To make matters worse, the newly-formed snow had filled up and concealed all holes and small crevices, so that in some places we had to almost feel each step with an Alpenstock before taking it, and notwithstanding these precautions many of us fell into cracks and fissures, so that the glacier presented a curious appearance, being covered with men, sheep, yaks, and ponies, floundering in and out of holes, and the baggage lay scattered about on its surface in a most promiscuous manner. We, however, managed to get over without serious accident and camped just above the Shyok river, stragglers coming in at all hours. The next morning we swam the ponies across the river again, but at an altitude 5,000ft. higher than the spot where we had crossed it only seven marches previously, and after marching for three days through more wild and uncompromising wastes of rock and ice at a mean elevation of 17,000ft., we eventually found ourselves on a great plateau, which we named the "Roof of Asia." Ascending an unnamed pass of 18,330ft., to which we gave the name of "Peyma-laptse" (the Tibetan for butterfly), after a beautiful butterfly we saw on the summit, we were much astonished to find no descent on the farther side.

It was exactly like going up a ladder and stepping on to the flat roof of a house, for from the summit of the pass we stepped on to this level table-land, a burning desert of sand and shingle, strewn with the bones of animals and bleached skeletons of kyangs or wild horses, and notwithstanding the high altitude it was absolutely devoid of snow. This plateau extended north for twenty-six miles, and as far as we were able to judge was about forty miles from east to west.

On two sides of this scorching wilderness was an almost boundless horizon resembling that of the ocean, and from it the whole world seemed to subside. On the western horizon nought was visible save three snow-clad peaks like white islands; one of these was the top of K2, 28,780ft., reckoned, I believe, to be the second highest mountain in the world. We saw a herd of kyangs or wild horses and some antelope standing near a lake, but to approach them was impossible, owing to the extremely boggy nature of the ground. Twenty-six miles of walking and riding at this high altitude, some 2,500ft. higher than the summit of Mont Blanc, caused many of the men to turn giddy and vomit and distressed the baggage animals very much, and ourselves also, as we had to walk.

Descending about 1,000ft. from this plateau we camped on the Chip-Chak river.

Next day we rested the men and horses after their trying march over the "Roof of Asia," and in the afternoon rode up to Karakoram river, camping at the foot of the great pass at an altitude of 18,000ft., the highest altitude we ever tried to sleep in sitting up.

On July 9th we made the passage of the Karakoram, about which we had heard so many astounding tales, and took the height with aneroid barometers—Negretti and Zambra's newest and best instruments—and made it 18,880, 19,100, and 19,300ft. On entering the pass we came upon the remains of forty-one horses and one dead man, so that, under certain conditions, there is no doubt that the pass may be a deadly one. One of our horses fell down dead on the pass from the rarefaction of the air. On leaving the summit we were joined by a pair of old ravens, who live there, and attach themselves to each caravan, following it north as far as the Chinese frontier fort of Suget, where they invariably take their leave, and fly back to their home on the Karakoram. The caravan men were very superstitious regarding these birds, who did accompany us all the way to the Chinese frontier, and we used to put food out for them every night and morning.

On the north side of the Karakoram the Yarkand river has its source, and for the next four days we gradually descended, following the course of the river until it lost itself to view, flowing, as it does, for some miles underground, to reappear again

under the guise of about 100 bubbling springs of clear water contained in an area of about two acres of ground. During these four days our lowest altitude was 16,800ft.; and on the fifth day we crossed the Chinese frontier, over the Suget Pass of 18,680ft., in a snowstorm, and, descending 5,500ft. over a glacier on foot, found ourselves in two days at the Chinese fort, where we were hospitably entertained by the Commandant, Ching Dolai. Here we had hoped to have been able to re-provision the caravan for a two months' march on to the Pamirs; but the Chinese either could not or would not provide us with the large amount of flour and grain we required. The consequence was we had no choice but to proceed to Yarkand, and try and make the Pamirs from there. While at the fort we heard that the Kilian Pass was not practicable owing to the great amount of snow. So we settled to go by Sanju, a route which, Ching Dolai informed us, was closed by special order of the Emperor of China, owing to raids made by some wild tribesmen on caravans, the last of which resulted in the murder of some Yarkandi merchants and the selling of their caravan men into slavery. We were, however, determined to pursue this route, and risk meeting these freebooters, telling Ching Dolai that we were a strong party, well armed, and quite able to take care of ourselves. So, after two days' vacillation on his part, and two days' driving on ours—the presents we gave him consisting of a sham-gold watch chain, a pair of snow-goggles, a broken compass, and a tin of Albert biscuits—he gave a sort of negative permission, and we started with a limited supply of provisions, and rode up the valley of the Karakash river for four days, through magnificent scenery, until we reached the Boschut defile which narrow, steep, and uncompromising gorge was the entrance to the Grim Pass.

I forgot to mention that the morning we left the fort the two Karakoram ravens sat perched on some rocks, watching the men loading the ponies; and when we marched, they spread their wings, and flew in the opposite direction, presumably back to their home on the Karakoram.

At Ali Nazur Kurgan, a Kirghiz encampment at the entrance to the Boschut defile, we hired forty yaks to carry our baggage over the Grim, which turned out to be one of the most difficult passes we had to contend with between the Himalayas and Russian Central Asia.

We made the passage of the Grim in a thick snowstorm, the altitude being 17,330ft., the last thousand feet of which was as difficult as it was dangerous for the transport animals, the yaks lying down and refusing to move, and even the unladen ponies showing the same signs of distress. At one time I thought we should be beaten back, but by dint of sheer hard struggling, not unattended with danger to both man and beast,

we managed to reach the summit of the pass (which is in reality the summit of the mountain), and found ourselves on a razor-backed ledge, where there was barely foothold, so narrow and sharp was the top. As it was snowing hard and very thick, we could see nothing in front of us but a fearful-looking precipice, down which we had to descend in a thick mist. It was here we had two fatal accidents, and we were very grateful to Providence we had not more. One of our best horses slipped and fell over the precipice and was never seen again; and one of the Kirghiz baggage animals shared the same fate. When we, with extreme difficulty and at the risk of breaking our necks, got down about 2,000ft. on the north side of the pass, and clear of snowstorm and mist, a sight met our eyes which was as unexpected as it was beautiful and refreshing. Below at our feet lay miles and miles of lovely green downs, the grass growing almost up to the top of the hills that sloped gently down to them. Three hours' march brought us to Kichik Ilak, where there was a large Kirghiz encampment, these hospitable nomads receiving us with every demonstration of friendship, and bringing us presents of yak's milk, curds and whey, etc. Having the utmost confidence in these people, we remained in their camp for two days, to rest ourselves, as we had been walking through snow and ice for seventeen consecutive days, at a daily mean altitude of 16,680ft. above sea level, the distance covered being 258 miles over eight mountain passes, six of which were 18,000ft. high. This was a more trying time to us than perhaps you can imagine. To begin with, we had nothing with us to drink except tea (no wine or spirits except one bottle of brandy in medicine chest), and a hot cup of tea is what we would have prized more than anything in the world. But at altitudes such as we were toiling through, water would not boil, even suppose we had any, which we had not, as every stream was hard frozen; therefore it was a case of putting tea into a kettle and adding snow and drinking it tepid. Yet we looked forward to our tepid tea after a long march on foot through snow from sunrise to sunset, as much as we did to our sheep that we killed and boiled also in tepid snow.

Leaving our kind Kirghiz friends, we rode for two days down the Sanju river, and on the third day we turned off due east up a river called the Yang Aghlak, to explore, and, if possible, cross the Chuchu mountains, and see what lay on the other side of them. Crossing the Yang Aghlak river about one mile above its junction with the Sanju, we proceeded in a north-easterly direction, and, climbing a steep cheraï, found ourselves in a high, narrow defile, which we conjectured must be the entrance to the Chuchu mountains, which did not appear to us very formidable after the Eastern Himalayas and Kuen Lun ranges. We ascended 3,520ft., and crossed the moun-

tains in the evening of the same day at an altitude of 12,500ft. It was a long and a steep pull, and several of our ponies came to grief with their loads, and some of the men got hurt trying to save the ponies rolling over the precipices. After a long and weary march of twenty-two miles over these mountains we halted, and the next day found ourselves in a country sufficiently uninteresting to warrant my not saying anything about it. It was quite uninhabited, until two days later we struck a sort of farm on the Poskee river, twenty miles from Sanju. The people of the farm were very hospitable, but much astonished at seeing a European. Needless to say, we never saw the wild tribesmen, nor do I believe that they exist. As no Englishman had ever been in that part of Chinese Tartary before, I made as careful a survey of that bit of country as circumstances would permit of, a small map together with some sketches being the result.

Sanju was reached on July 25th, but is too uninteresting a village to waste time in describing, the one redeeming point about it being its wealth of fruit. We left Sanju, and rode for ten days under a burning sun over a sandy waste that forms the western extremity of the great desert of Gobi—passing through the oases of Khushtagh, Oi-Taghrak, Bora, Kargalik, and a few minor ones, containing villages, corn-crops, and fruit-orchards, brought into life by irrigation, whose extraordinary wealth of peaches, apricots, nectarines, figs, melons, etc., it is impossible to exaggerate—and, crossing five rivers in full flood with no little difficulty in the absence of boats or bridges, arrived at Yarkand early in August, the distance covered being 953 miles from the start in April.

During our sojourn in Yarkand we were most hospitably entertained by the merchants of the city, who placed a house and garden at our disposal, and as our horses were in very poor condition after the severe march from Leh, we turned them on to a field of lucerne and doctored their sore backs, during which time small-pox broke out in our camp.

Just at this time all sorts of rumours were flying about the bazaars regarding the movements of the Russians on the Pamirs, the result being that a Chinese force was despatched to that region, and we had to follow in its rear.

On the second day out we marched across the Desert of Shaitan Kum, a sun-stricken waste without a drop of water, on whose burning sands lay many a dead horse belonging to the force we were following, after emerging from which we entered a mountainous country again, and passed through many curious defiles, where in some places the stupendous rocks on each side almost met overhead. In some of these places the ponies had to be unloaded and the baggage carried by the men; it was therefore with some difficulty we made our way.

On August 22nd, knowing we had a long march before us, owing to the scarcity of water on this eastern side of the Kizil Tagh Mountain, we started before daylight, and crossing the Kara Dawan, or Black Pass, found ourselves overlooking the most gigantic basin, in which we counted thirteen small ranges of mountains between us and the blue haze that enveloped the far hills. It was the most extraordinary panoramic view that lay unfolded at our feet, one far too stupendous in its wild magnificence to attempt to reproduce either by photography or with the painter's brush. The descent of 2,500ft. was very steep, and we had as usual to make it on foot.

The black shale over which we travelled showed plainly the presence of coal and iron, the sides of the hills being streaked with unmistakable veins of those valuable minerals. We soon came to a deadlock at the far end of the ravine in the shape of a high waterfall, the stream that we were following tumbling over an apparently white marble precipice several hundred feet deep.

Peering over this abrupt termination to our advance, we looked straight down the abyss and thought we should have to turn back and seek some other way, but finding some Chinese soldiers there, they gave us to understand there was a zig-zag track cut down the face of the precipice to the right of the waterfall, and we had no choice but to attempt it, although they said they had lost many horses in the descent two days before.

We first unloaded the ponies, each of which made the perilous descent in charge of five men with ropes, who carefully lowered them down from rock to rock until the whole sixty got down in safety. Then the baggage had to be lowered down also, so it was evening before we were able to make a fresh start from the bottom of the waterfall, the water of which was quite salt. All around lay the dead horses of the Chinese who had been less fortunate than ourselves in making the perilous descent of what our Kirghiz guide, Mahamad Ahmin, was pleased to call "the worst descent in Asia." We camped on the Kiaz river in a grassy valley under some poplars, where Major Roche made some additions to his already valuable collections of entomological specimens.

Next morning we rode down the Kiaz river, thence through sparsely cultivated valleys where the natives were busy threshing their corn, the process being as follows: The corn is laid down on the ground, and a pole stuck in the middle of it, to which are attached six donkeys and four cows abreast; a boy runs behind with a whip, and the animals trot round and round the pole, treading out the ears of corn as they go.

At the junction of the Kiaz and Chalung rivers we altered our course from south to west, until after two days' riding we

reach Chehil Gombaz, where stands an abandoned fort built by the Chinese.

At Tashkerim we came across the Chinese troops, who, having left Yarkand with the ostensible object of marching on the Pamirs, had taken up a permanent position at this spot and never got any further. As I was acquainted with the officer in command, Kargalik, I went to pay him a visit, and ended by offending him deeply by extracting the cartridges from my revolver before handing it to him for inspection. We continued riding up the river, gradually ascending from 6,700 to 10,800ft., the elevation of Chehil Gombaz, and the following day crossed the Tirak Pass, 13,600ft., ascending 2,800ft. in two-and-a-half miles, or nearly one in five. It was a severe pull for the baggage animals as it was a very hot day.

The next day we journeyed up the Toilobolong river, through a wild and almost impassable ravine which bears the same name. It was a narrow deep gorge, through which flowed a rapid torrent, which we had several times to cross, and as there was no track to indicate the fords, it was all pure chance work our finding any. Over huge rocks did we scramble, leading our horses; and in some places these boulders presented such formidable barriers to our advance that the ponies had to be unloaded and the baggage carried by the men. After some hours of this break-neck work, ascending 4,000ft. while under a burning sun, varied occasionally by plunges into deep pools when attempting to cross the torrent in the wrong places, we found ourselves on a piece of open tableland at an altitude of 13,800ft., a plateau of rough coarse grass and granite boulders, and in front of us rose the great snow-clad mountains of Sariqol, the eastern barrier of the Pamir region. After leaving this plateau we kept ascending until the cold of the declining day became almost as severe as the noonday heat of the defile had been intense. As the sun set the snow came down; so, hastening to choose a spot for the camp in the least exposed place we could find, we commenced that unpleasant and finger-freezing work of pitching tents in a blinding snowstorm at an altitude of over 15,000ft., with the thermometer indicating 17° of frost. Next morning many of the men were down with fever, owing to sudden violent change of temperature the previous day; but I determined to push on, notwithstanding, as we had no fuel of any sort left, and our provisions were nearly done. About mid-day we came upon a beautifully clear sheet of water, out of which the Yambulak river flows. This lake was surrounded on three sides by stupendous cliffs, rising sheer up 2,000ft. from the water's edge, one huge glacier standing out in bold relief in the middle of them, which doubtless gave to the water the most beautiful emerald hue I ever saw. The altitude of this lake, which we took to be the Yambulak, as it lies so near the pass of

that name, we made 15,800ft., and the summit of the pass beyond it 16,530ft. The pass was short, and consequently steep, and covered with large loose stones, which kept rolling down as each horse tried to get a foothold. We had to walk up it as usual, and lead our horses—all except the sick, whom we mounted on spare ponies.

The sides of the pass were deep in snow, and the strong north-east wind that we met on the summit did not improve matters in the way of temperature. I was very glad when we mustered the caravan on the far side on the Chichiklik plain, as many of the stragglers were weak with fever, and every one on these occasions has to look after himself. Again we had to undergo one of those violently rapid changes of temperature so trying to men even in the rudest of health, there being a difference of 91° between the heat of the plain and the cold of the camp in the morning. Traversing this waste we again entered the hills on its south side, and, crossing a small pass, reascended until we reached a third pass called the Kokmainak, 16,150ft. which we negotiated in the dark, as we were forced to push on until we could find water. Wood there was none, but we were lucky to find the remains of a large Kirghiz camp, and the dried camels' dung, which lay all around it, served to make splendid fires, at which the men all got thoroughly warmed before seeking that repose to which they were so fully entitled after the severe ordeal they had been through that day.

The next morning we had so many men down with fever, that I had serious thoughts of remaining where we were for a day, but on consideration I deemed it more advisable to push on to Tashkurgan owing to want of provision. So we struggled on, down the Kokmainak gorge, leading our horses all the way walking in the river, the water being, luckily, shallow, until we emerged on to a large desert plain with one low range of sandy hills running through the middle of it, over which were visible the tops of more mountains of the Sariqol Range.

We reached Tashkurgan after dark, and occupied two Kirghiz akais that had been pitched close under the fort. We remained there a day or two to re-victual the caravan, and also to give the sick men a rest; and, after riding up the left bank of the river in a southerly direction for three days, arrived at the dilapidated Fort of Ujad Bai, which stands at the fork of the Khunjerab and Mintaka rivers. Striking off to the westward from this point we entered the Taghdumbash Pamir, and, after three days more riding, established ourselves in a permanent camp on the Kuturuk river, where we remained for fifty-five days. It was owing to our camp being laid out on military lines, on a square, sixty yards to each face, and our making a road round it, and building a stone kitchen in the centre that

gave rise to the rumour that the English had built a stone fort on the Pamirs, and caused a Mandarin to travel from Kashgar, fifteen marches to our camp, only to find the stone fort was a kitchen. Our caravan, which by then mustered sixty horses, and with Kirghiz followers about forty men, was also magnified into an armed English force. The Chinese were very jealous of our having established ourselves on their Pamirs, and gave orders to Osman Beg, chief of the Kirghiz of Mintaka, not to supply us with food for men or horses in the hope of starving us out of the country.

The weather began to get cold at the latter end of September and beginning of October, the thermometer registering minimum temperatures of from five degrees to eight degrees below zero every night, and sleeping out without a tent up in the hills when shooting *ovis poli* was rather cold work. During our two months' residence in the permanent camp we made several exploring expeditions, amongst others crossing the Hindu Kush by the Kilik Pass, which we found was a shorter way to Hunza and Gilgit by three days than over the Mintaka Pass, which is the usual route.

On hearing that the Russians had turned the Chinese out of Aktash, a fort at the east end of the little Pamir, and demolished it, I resolved to go and verify the statement, which, like all Kirghiz rumours, had to be taken *cum grano*. So, leaving Major Roche at the permanent camp, I started with five men for the valley of the Aksu river, and, crossing the Paik Pass, 16,370ft., arrived after four days' marches at the Fort of Aktash, which I found in ruins, not one stone standing upon another.

After my return to the permanent camp at Kukturuk we struck our tents at the end of October and started for the middle and upper Pamirs, riding in a westerly direction up the valley of the Wakhjir, having previously despatched those of our sick who could not stand the cold of a Pamir winter across the Hindu Kush to Gilgit.

We crossed the Wakhjir Pass, 16,680ft., which is the frontier between Chinese and Afghan territory, and when we descended and struck the Ak Bilis river we found ourselves in the Wakhan district of the Pamirs and within the dominions of the Amir of Afghanistan. Riding for two days down the Ak Bilis river we reached Bozai Gombaz, a now historical spot, as it was there Captain Younghusband was arrested by the Russians in 1891. From there we proceeded east to the Chakmak Lake, and passing the source of the mighty Oxus, which we claim to rise simultaneously with the Aksu river at the east end of the lake, we crossed the mountains of the little Pamir by the Andamin Pass (15,150ft.), and debouched on to the great Pamir plateau in a heavy snow storm. It was just before crossing the

pass that we came across a bare, gaunt, hungry-looking wild dog, who attached himself to our caravan and soon got quite tame. To him we gave the name of Pamir.

Our objective point after entering upon the great Pamir was Wood's Lake, now called the Victoria, and what between the stupidity of Abdul Kerui, a Kirghiz who pretended to know the locality of the lake, and the advent of a heavy snow storm, during which we lost our caravan, we found ourselves at night on the bank of the Chistoba river, a long way north-east of the lake and well out of our course. That night, November 4th, we had at 8-15 a fine view of the eclipse of the moon, with the thermometer at eleven degrees below zero. The next morning we worked our way by compass and crossed a small pass (15,133ft.), which for want of a better, we named the Fox Pass, as our dog (Pamir) ran a fox to earth on the summit. In the evening we came within sight of a lake which turned out to be one of the small lakes, the western extremity of which lies about three and a half miles from the east end of the Victoria, which lake we sighted next morning. We rode along its north shore for two days making short marches, as our mornings were occupied taking observations, sketches, and photographs.

On the third day we camped about eight miles down the Pamir river, which flows out of the west end of the lake, and forms a junction with the Ab-i-panj at Langar Kisht, and is, therefore, a tributary of the Oxus. As we lost twenty-three of our horses during the night, it was late before we recovered them and were able to make a start to explore the mountains between the Karghosh Pass west and the Bash Gombaz Pass east, our object being to discover a pass that led straight from the west end of the Victoria Lake over the mountains of Yashil-Kul, a lake lying at the west end of the Alichur Pamir. So choosing an open-looking but very stony nullah we rode up it due north for eight miles until we came on to a circular plateau in the midst of wild stony hills. In front of us was a ridge which we took to be a watershed, but on reaching the summit (15,230ft.) we saw we were mistaken, as three-quarters of a mile farther on was a narrow pass, on the summit of which (15,700ft.) was a small but perfectly square frozen lake, and its peculiarity lay not only in its perfectly rectangular shape, but in its close resemblance to an artificial reservoir, its sloping sides being paved by nature with flat stones fitting closely together, giving it all the appearance of solid mason work. We therefore named it the Hauz Dawan, or Reservoir Pass. From the Hauz Dawan we descended in two marches on to a flat sandy desert, 300ft. below which was a large basin extending east and west for miles. In it were four lakes; one, the Sassik-Kul, three miles long by one broad; two, the Tuz-Kul, and two smaller ones, the last being the Kharghosh-Kul at the end of the stream running

from the Kharghosh Pass. The altitude of these lakes was 13,400ft., and the whole basin which contained them was encrusted with saltpetre. Rising on to a ridge we came to another small pass, which we named Guljia-Dawan, from the large number of horns and skulls of these animals (*ovis poli*) that we saw lying about. From this pass, which is not marked on any map, we had a fine view of the hills of Shighnan and Rosban. We reached Bulun-Kul (13,200ft.) and camped at an abandoned Afghan outpost. The next morning we pushed on to Surmatash, skirting the shores of the Bulun-Kul, until we came to the river which connects the two lakes, Bulun-Kul and Yashil-Kul. In none of the maps are these lakes made to have any connection with each other, whereas they are in point of fact almost one, the little river which connects them being but half a mile in length. Bulun-Kul lies south-east of the Yashil-Kul. This latter lake is the next largest on the Pamirs to the Kara-Kul, being about sixteen miles long. It lies east and west. The Ghund river, which rises at the west end of the lake, flows into the Ab-i-Panj, and is one of the many tributaries of the Oxus.

That day being November 9th, the Prince of Wales's birthday, we drank His Royal Highness's health, and although the toast was given in a small Cabul tent, and drunk in tea made with snow, with the thermometer at ten degrees below zero and in about as wild a spot as in Central Asia could be found, yet I venture to think that our wishes for his health and prosperity were quite as hearty as if the toast had been quaffed in the best of champagne in the most gorgeous banqueting hall in Europe.

Surmatash is the spot where only a few months before the unfortunate conflict took place between the Russians and Afghans, concerning which (as it comes under the heading of politics and not geography) I shall be mute. Close to the scene of the fight we found four Afghan great-coats lying on the ground; they were all more or less blood-stained, and, on examining them closely, we could see pretty clearly how their ill-fated owners had met their deaths. One had seven bayonet or lance thrusts through it; another had the left-arm almost severed through at the elbow, and the other two were in worse plight. The dead Afghans were all on a hillock just above the river. They are not interred, but all huddled up together inside an enclosure composed of four low walls built of rough stones. Over the bodies have been thrown two namdahs, over which some mud has been sprinkled, the whole kept down by five large stones to prevent any beast of prey from scraping up the corpses.

Leaving this now historical spot, we marched for five days through the Alichur Pamir along the river of that name, arriving on the third day at the Nezatash Pass, 14,340ft. There we fell in with a Cossack patrol, who, finding one of our men looking

for a stray horse, took him to be an Afghan and threatened to shoot him, but on seeing us approaching left him alone. Two days after crossing the pass, we arrived at Murghabi, Colonel Yonoff's headquarters, where we were very well and hospitably received by the Russian Officers in charge of the fort, as the Colonel had just left for Tashkend. There we remained for two or three days, as our kind hosts would not hear of our leaving them, and we soon became the best of friends. At the end of November we marched towards Rang-Kul, another smaller Russian fort, and while riding along the southern shores of the frozen lake of Chor-Kul, we came across a very peculiarly-shaped rock, which has been very properly named the Lamp Rock, as it has a small cave near its summit which is pierced right through, and the sun shining through the little aperture gives it all the appearance of a lighted lamp. On reaching the end of Chor-Kul, which is from six to seven miles long, we came upon the Rang-Kul, another smaller lake, separated from the Chor-Kul by a quarter of a mile of land, no stream even connecting the two pieces of water; and yet on most of the maps they are represented as one large lake under the name of Rang-Kul. It was a bitter cold ride of twenty-eight miles from Ak Baital to the Russian fort, where we arrived three hours after dark, with the thermometer at fifteen degrees below zero. There was but a small force of Cossacks there under the command of two officers, who made us most welcome, and administered as best they could to our wants.

The next day we found the thermometer had been as low as twenty-five degrees in the night, and we all agreed as to Rang-Kul being the coldest place on the Pamirs. One of our horses died of cold that night, frozen to death.

The fort is situated at an elevation of 13,500ft. above the sea, on the edge of an immense plain. The officers showed us round the men's quarters, surgery, bakery, and cooking kitchens, and we were as much struck there, as we were also at Murghabi, with the simple manner in which the officers live; and how very well cared for the soldiers are. I tasted their rations, which were excellent. In fact, as we had been many months without vegetables, the men seemed much amused at my taking more than one help of their excellent soup, which was full of good meat and three or four sorts of vegetables.

The Russian system of housing their men on the Pamirs is an excellent one. Three akoiis with only five to seven men in each are placed together, and a brick stove built in the centre of the three and stoked from the outside, so that three stove pipes warm the whole fifteen to twenty men from one wood fire. In addition to these most necessary precautions against the cold of a Pamir winter, they build an outside wall of brick round each akoi, so that, the men told me, they never suffered

from cold within quarters. The officers had dug holes and sunk their akoi about eight feet down, and got their only light from the roof, which struck us as being a very sound proceeding.

The afternoon of the second day we spent with our kind hosts. The weather gave us some sort of idea of how cold it could be, as the thermometer fell to ten degrees below zero in the afternoon, so we had recourse to various expedients to keep ourselves warm. First we had Russian peasant dances, then Cossack dances, all to the music of an accordion. Then I tried to teach the officers the figures of a reel, and hummed the music of an old Highland tune to the Cossack who played the accordion, and which he picked up very quickly, and, such as it was, we danced it to keep ourselves warm, lots of the Cossacks joining in. That was the first Highland reel ever danced on the Pamirs, I should say, to Russian music. As we were going to march the next day, a rather imposing and certainly interesting ceremony followed, namely, the drinking of the healths of Queen Victoria and the Emperor of Russia, the whole garrison saluting during the speeches and cheering at the toasts. We were genuinely sorry to leave our hospitable quarters and the cheery good fellows who had been our hosts, but December was fast approaching, and I had a long way to go yet before attempting to make the passage of the Tian-shan Mountains, which are not easily crossed in the depth of winter. Major Roche had to return to Kashmir before the passes were closed from Gilgit, and Kashgar also had to be reached first. So the next morning we started and marched to the foot of the Ak-Berdi Mountain, crossing the Kokbeless Pass (15,300ft.) en route, from the top of which we had a splendid view of the great Mustagh-Ata, whose rugged ice-bound peaks rose some 25,800ft. into the wintry sky.

The Ak-Berdi being the Russo-Chinese frontier, Captain Brjesicki bade us adieu there, and we commenced to make the ascent of this mountain, which was deep in snow, the last 1,500ft. of which was as bad as the Grim Pass, and we had no yaks. The cold was intense, with a north-east wind blowing the loose snow into our faces. We managed after several hours' struggling to get over the summit—for there is no pass—and found the descent on the Chinese side ever so much more precipitous and with double the amount of snow. Riding was of course impossible; in fact, we had to go down part of the way on our hands and knees, our horses following us, and occasionally slipping down and rolling us over. When we eventually reached the bottom in safety, after six hours of this breakneck work, we were all so done that we halted and camped just clear of the snow in the valley of the North Ak-Berdi river.

The next day we reached the Chinese fort of Bulun-Kul, where we remained for the night in a Kirghiz akoi. We sent

the caravan on ahead, and were just breakfasting when a Chinese officer, accompanied by fifteen soldiers, burst most unceremoniously into our akoi and demanded our passports. We explained that they were locked up in our baggage with the caravan. This Chinaman, whose name was Ching Wang, said, "I don't believe it; I know you are Russian spies." We protested we were English, and sent a man after the caravan to get our despatch boxes which contained our Chinese passports. Ching Wang went on in the most insulting manner, threatening to send us back to the Pamirs under escort. I told him I would report him to the Taotai at Kashgar for insolence, and ordered him to leave our akoi. He then surrounded the akoi with his soldiers, and we remained their prisoners until our passports arrived. After waiting some hours we produced proof of our identity, when Ching Wang rode off with his soldiers without a word of apology, and we were free.

On our arrival at Kashgar, six days afterwards, a letter of remonstrance was sent to the Taotai, with a demand for an apology in writing in the name of the Chinese Government for the treatment we had been subjected to, and also for the punishment of Ching Wang. In twenty-four hours the necessary apology was given in writing by the Taotai, and a promise that the officer should be punished.

Riding for eight miles along the shore of the Bulun-Kul Lake, and passing the second Chinese fort at the north-east end of it, where the Gez river has its course, we entered the Gez defile and camped at the first convenient spot. The river runs through a deep narrow gorge on the left of the track, which is impossible to see in some places, and which leads over miles of stones and rocks all heaped up in wild confusion, intersected every now and again by deep and almost impassable dry water-courses, all the result of recent landslips. The next day it blew a gale and the landslips were too frequent to be pleasant, as we were riding high up above the river on the edge of the precipice overhanging it on a rough track, not three feet wide, with the chance of those loose stones, rocks, and ice coming down on to us from the hill above on our right. At one turn a fearful gust of wind caught Roche's pony and knocked it down while he was on its back, but luckily it happened not in a dangerous spot. And so we toiled on all day with a high wind off the snow mountains, freezing us to our very bones, until we came to a dead-lock in the shape of a mountain torrent which crossed our track, and which was dammed up by huge blocks of ice, thus forming a large pool of water far too deep for the ponies to cross. However it had to be crossed, there being no other possible means of advancing, and to turn back was out of the question; so we set the men to cut away the ice below the pool with their ice-axes, which was not an easy job, nor was it a very safe one, as there

was a high waterfall below the ice dam, and there was just the chance of the ice on which the men were standing being loosened by the cutting of the channel, and all being carried away by the rush of the imprisoned water over the fall. Our men worked away with a will and succeeded in cutting a canal, and then letting the water off until the pool was sufficiently shallow to allow of the passage of the caravan.

That night we camped near some hot springs. The third day the defile widened out a little and opened up fresh beauties to our appreciative eyes at every turn, as we proceeded further eastwards. The scenery, in fact, became so savagely grand that we ceased to grumble at the roughness of the country over which we were travelling, and at our very slow means of progression, viz., nineteen miles in two days. Rounding the base of a huge rock we suddenly came face to face with a scene which will live for ever in my memory. To attempt to faithfully describe its chaotic magnificence, is almost impossible. Picture to yourself a background of wild rugged mountains, whose snow peaks towered into the sky—rocks of every fantastic shape, with huge festoons of icicles hanging from their jagged edges; ice-bound torrents and frozen waterfalls, huge boulders thrown about in the wildest confusion, the whole foreground seeming to have been lately subjected to some mighty convulsion of nature—and then you can form no idea of the savage splendour of this scene of chaos.

After gazing for some time with awe and wonder upon this enthralling picture, whose weird beauty was enhanced by a diaphanous haze which floated over it all, we rode on towards the distant blue hills which marked the termination of this wild gorge.

One more morning of modified difficulties in the defile, and then we debouched on to a plain and camped at a village called Tashbalyk. The next day we halted at Borah Khitay, where the natives not only refused us entrance into a Chinese rest-house, but also refused to sell us corn for our horses, or wood for our cooking-fires. We told them that if we did not get what we wanted by paying for it, we should take it by force, to which they did not demur; on the contrary, they looked on with complacency while we broke open the door of the rest-house and took possession of a room, and seemed utterly indifferent when we set four of the caravan men to cut down one of their trees for firewood; and the only person who seemed to resent our breaking down the door of the corn-store, and helping ourselves to what we wanted for the horses, was an old woman who danced with rage on the roof calling us all sorts of names.

Leaving some money for the corn with the old lady's son, we next day marched through a cultivated country and villages for about eighteen miles, reaching Kashgar in the evening, where

we were hospitably entertained by Mr. Macartney, the English political officer there.

About December 10th both our caravans were re-provisioned and the horses re-shod. (I say both our caravans, because it was here that Major Roche and I had most reluctantly to part, as he could not cross the Russian frontier. So we divided the caravan up, drawing lots for the fifty ponies, thus having twenty-five each.) And we each made a start; he east to Maralbashi, in the hopes of shooting a long-haired tiger before returning to Gilgit, and I north-west, towards the Tian Shan Mountains that divide the dominions of the Emperor of China from those of the Czar. As heavy snow had been falling for some days, fears were expressed at Kashgar as to the feasibility of my crossing the mountains. However, taking with me only eight of our Tibetans, I made a start all alone to cross the whole of Russian Central Asia from China to the Caspian, leaving behind me, with much regret, Ahmed Din my interpreter, who could proceed no further with me. The first night I halted at the village of Sulok, and next day continued riding over the dreary plain in a north-westerly direction, passing the old fort of Andijan Kichik, making but little way, as the snow was up to the ponies' hocks. In the evening we left the plain, and, striking the Minyul river, rode up the little valley until we reached a long, low, rambling fort, where we halted for the night. I came in for one of those glorious sunsets for which this part of Central Asia certainly ought to be famous, and would be were it better known. The great beauty of these sunsets lies in the extreme delicacy of their colouring. I have often seen evening tints in the sky, especially on the Pamirs, the colour of which I do not believe any landscape painter in the world could give a name to. After dismounting I walked up to the top of the ridge overlooking the old fort, and the view that met my eyes was supremely lovely. On the right was a range of hills whose high, needle-shaped peaks caught the glow of the setting sun that tinged the snow that seemed to lie so softly upon them with a colour I can only describe as that of a La France rose. On the left towered high sandstone cliffs above the little river, in whose half frozen waters the evening tints were faithfully reflected, and beyond lay the Plain of Kizil-ui surrounded by hills of graceful outline, the whole arrayed in its winter garb—one glorious, dazzling sheet of purest white against a sky of the most delicate turquoise. Before leaving the fort next morning I took the altitude, and found we had ascended already 1,300ft. from the level of Kashgar.

On crossing the Minyul we nearly lost three horses in a quicksand, and an hour afterwards we had to cross the river again, which, being open water, with a strong current in the middle and frozen on each side, made the downward plunge from

the ice into the current a source of some danger to the horses. We cut a path through the ice from the water to the shore on the landing side, when we discovered how deep the water was; and then, after a deal of pushing and shoving, and pulling and beating, we managed to get one horse across, and the rest followed.

It was sunset when we rode past Kanjungan, and very late and bitterly cold when we reached the Kirghiz encampment of Kizil-ui, where Tura-Khan, their chief, offered me the hospitality of his akoi. Taking the altitude I found we had ascended another 1,470ft. that day, being at an altitude of 7,520ft. It was here I made the discovery that I had forgotten to buy any sugar in Kashgar; so, having got some honey from the Kirghiz, I put a spoonful in my tea and found it delicious.

The next day I crossed the Ken-su Pass, and camped near an old serai. Then on into a country more curious than beautiful, where we met several caravans of camels; and in each instance one of the horsemen who accompanied them carried a hawk on his wrist. They are great falconers in this part of Central Asia, and use these birds for hawking hares, partridges, and chickens. On the fifth day from leaving Kashgar I arrived at the Kirghiz encampment of Aksalir. That night we had two very severe shocks of earthquake that frightened my men, who had never heard of such things before, and caused a stampede amongst my horses.

Next day, just before dark, we reached a regular forest of large trees, and, finding water, I called a halt, and had my tent pitched in a nice warm spot under some big trees, and, making a huge fire just in front of my tent-door, cooked my dinner myself, as Kassoul, the cook, returned with Major Roche, and sat over the fire afterwards and smoked my pipe in the real luxury and enjoyment of being once again, the first time for eight months, in a large wood of forest trees.

Next morning I found nine of my ponies missing, having lost them in the jungle during the night, and as it took some little time to find them it was late before we made a start. After emerging from the jungle, we mounted a high ridge of pink sandstone rocks, and came down on the other side upon a beautifully wooded valley with a large river running through a broad shingly strand, down to the edge of which sloped banks covered with low brush-wood which fringed the borders of a large jungle of forest trees. This river proved to be the headwaters of the Kizil-su, which flows past Kashgar and loses itself, some say, in the sands of the great desert of Gobi, and others aver that it empties itself along with the waters of the Tarim into the lake of Lob in the same desert. Crossing the river, which was rather deep for our horses, we entered the jungle and rode for several hours through a number of hardwood trees I could not put

a name to, and, passing large clumps of high, graceful, feathery grasses, something like the pampas-grass, at length emerged again upon an open plain and came in sight of the Chinese frontier fort of Ulukchat, which stands some little way up from the river. Here I had a little trouble with the Chinese officer, as that individual refused to look at my passes, wanting to keep me waiting on horseback at the gate of the fort while he ate his dinner. The annoyance and insolence of these small Chinese officials is as well known as is the courtesy of those holding high positions, and I had had experience enough of this former class of gentry to know how to deal with them. So I sent one of my men who spoke Chinese into the fort with a message to the Ambassador, saying if he did not come out instantly and look at my passes, I should go on without showing them, and should report him to the Taotai at Kashgar. That had the desired effect of bringing out of his den, a fat, bloated Chinaman, more like a porpoise with a pig-tail than a soldier, who cringingly informed me the old fort was at my disposition, if I would only halt there for the night. I got my passes put *en regle* and departed. In two days I reached the Russian frontier fortress of Irkishtan, having spent one day in hawking partridges at Yagan with the Beg of the Kirghiz, who had some fine, well-trained hawks. Irkishtan is prettily situated on a promontory overlooking the River Chenksu, and I was most hospitably entertained by the Cossack officer there for two days; and when I continued my journey he insisted on escorting me with thirty of his men for about half a day's march. The escort, mounted on their little shaggy horses, rode in fours, singing all the time, the rocks echoing back the music of their wild songs, which were extremely tuneful and very well sung.

On December 22nd I found myself in the heart of the Alai Mountains, in very deep snow, and with the thermometer varying from twenty degrees to thirty-five degrees below zero. I crossed three passes—the Kok-bel, the Ek-zek, and the Borak, all of them very difficult ones owing to the mass of ice that covered them. On Christmas Eve the temperature fell to thirty-eight degrees below zero, and I woke to find three of my horses lying dead, frozen at my tent door. On Christmas Day I made the passage of the great Terek Dawan on foot; it was one mass of snow and ice. It is barely 14,000ft. in height, but the descent of 5,350ft. was very steep and a sheet of ice, the last 1,000ft. being accomplished by moonlight. It is considered the worst pass in the Alai range. After marching for two more days I arrived at the second Russian fort of Gulcha, where there were about forty Cossacks. I was much struck with the neatness and cleanliness of their stabling accommodation.

Crossing three more passes, and then riding through a magnificent down-country I arrived at Osh in Ferghana, where I

was hospitably entertained by Colonel Grombshevsky, who has lately been appointed to the command of the district. At Osh I sold my horses, tents, and camp equipage, having no more use for them, as the remainder of my journey through Russian Turkestan was accomplished in tarantass and in sledges. I also parted from my faithful Tibetans, to each of whom I made a present of a pony to ride back to Kashgar, where they intended to remain until the first caravan set out for Ladak. A better set of men, a hardier or a more willing, I have never met with, and during the whole eight months they were with me I never once had to punish any of them or cut them a single rupee of their wages. I also include in this most of the men whom I left with Major Roche.

From the Punjab, following the route we were forced under the circumstances to take, I had travelled for nine months on horseback and on foot 2,165 miles over forty-one mountain passes, some of these amongst the highest in the world, crossed sixty-one rivers on horseback, during which time I am thankful to Providence we never lost a man and only seven horses. Leaving Osh and my good friend Colonel Grombshevsky I proceeded to Andijan, and the next day to Marghilan, where I was again most hospitably received by the Governor of Ferghana, General Karalkoff, who made my stay of three days there most pleasant to me. From Marghilan I went to Khokand and Khojend, being snowed up on the steppe between the two cities in a bouran, which answers to our blizzard, and my sledge and horses had to be dug out. From there to Tashkend I had a very bad time, being snowed up again in a bouran that lasted five days, at a small post-house, called Murza Rabat, on the steppe that stretches from the Syr Daria (the Jaxartes of the ancients) to Tashkend.

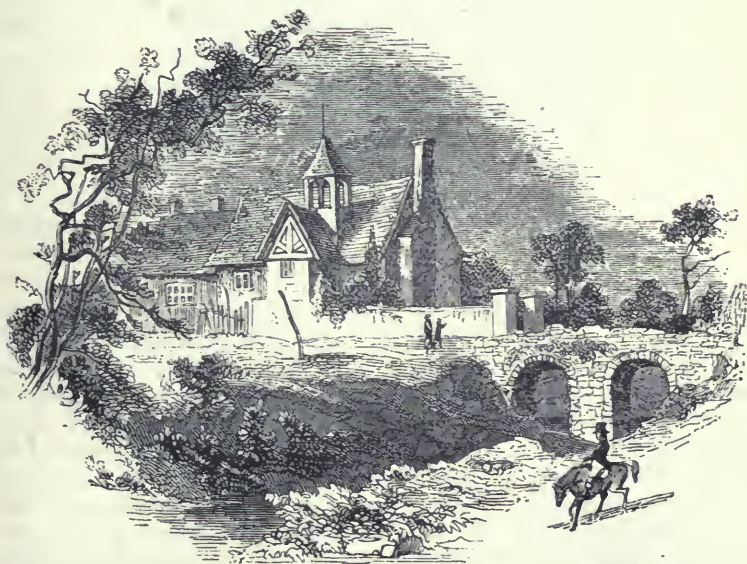
By this time I had quite run out of provisions, and the resources of the little post-house were rather heavily taxed, for besides myself there were the men in charge of three different sets of mails, all snowed up at Murza Rabat, although the mails were carried in eighteen sleighs with four horses each. In the post-house were only two rooms to contain the mail bags, the six men in charge, and myself, and, of course, no beds. On the fifth day, however, I started in a sleigh with five horses, and, after being upset several times in various snowdrifts, managed to reach the next post-house, where there were no horses to be had, and I found eleven Sarts (natives) occupying the only two rooms. However, I managed to sleep on the floor, and next day got four horses harnessed to my sleigh and arrived late that night at Tashkend, after having taken seven days to do a journey of three. It was now the middle of January, and my object was to get to Khiva, going round by Kasalinsk and the Sea of Aral; but the Governor-General, Baron Wrewsky, whose

guest I was, pointed out to me how hopeless it would be to attempt such a journey at that season of the year, especially as the Oxus was closed for navigation owing to the ice, and to attempt a land journey in the snow over the Khivan desert in this, the most severe winter ever known in Central Asia for years, would be little short of madness; so I had most reluctantly to give it up as a bad job. Day by day the weather got more and more severe, and the snowstorms were frequent until at last the mails ceased to run, as the roads were all blocked. Telegraphic communication alone remained open, and that at last was closed; but not before I discovered by means of the wires from Askabad that my long-cherished plan of crossing the Persian frontier over to Meshed, and so working my way down the Afghan frontier, and through Beloochistan to the Persian Gulf was also knocked on the head, all the roads and passes over the mountains being so deep in snow that I was unable to procure a caravan of camels or any other beast of burden to cross the hills into Khorassan; so I determined, as soon as the roads were open across the steppes, to proceed to Samarkand and take the Transcaspian Railway to Uzunada, cross the Caspian to Baku and take boat from there to Enzeli, ride to Teheran, and so on to Bushire, and reach the Persian Gulf that way. But it was a veritable case of *l'homme propose*, for I was snowed up for eighteen days at Tashkend; and when at last the road was open, and the River Syr Daria negotiable on foot over the ice at Chinaz, there being no bridge, we were almost in the month of February. It was on the last day of January that I left Tashkend and started for Chinaz. Crossing the river on the ice I traversed the Golodnia or Famished Steppe, a howling wilderness of ninety miles, without a tree or rock to break the monotonous line of what appeared to be more a frozen ocean than dry land. I reached Djizak at night and rested at the post-house till daylight. Our route then lay through the gorge of Jilau-uti, through which flowed a river with so many windings that we crossed it seven times before emerging from the defile. From this gorge we gradually descended till we reached the valley of the Zarafshan, and shortly afterwards the domes and towers of Samarkand came into view, lit up by the golden rays of a winter sunset.

Entering the city of Beautiful Ruins, we left the high towers and domes of the mosque of Shah Zindeh on our right, while to the left lay the dome of the mosque of Bibi Khanum. On passing through the native bazaars, which are the smallest and most insignificant of any that I had seen in any other city of Central Asia, we suddenly came upon the huge back walls of the Righistan. But it was too late that evening to visit any of these magnificent ruins, so I postponed it till morning when, accompanied by Colonel Galkin, chief of the staff to Count Rustovtsoff,

Governor General of Samarkand, I spent a day amongst the ruins of this once most gorgeous city of Asia. We visited the tomb of Tamerlane, who died in 1405, the Mosques of Shah Zindeh and Bibi Khanum, the daughter of the Emperor of China and the favourite wife of Tamerlane, and the Righistan, the Medresses of which form three sides of the great square. To attempt a description of the magnificence of these mosques, tombs, and colleges would take hours; suffice it to say, that there exist in no other part of the world any ruins that can convey so well to the mind the gorgeous splendour of the architecture and the lavish expenditure on external as well as internal decoration that obtained during the thirteenth, fourteenth, and fifteenth centuries in Asia.

Leaving Samarkand I arrived at Bokhara, then crossed the Oxus at Charjui, and so over the sandy waste that forms the south end of the Khivan desert, to Merv, Askabad, and the Caspian. I crossed the Caspian to Baku, arriving there the very day the boat had sailed for Enzeli, and there was not another for a fortnight. The prospect of a fourteen days' sojourn at the city of the fire worshippers was not agreeable, so I went to Tiflis, that I had not seen since 1859, when it was but a small town, and so to Batoum, where I took the steamer to Constantinople, and returned to India, landing at Karachi in March, 1893, just thirteen months since I landed there in February, 1892.



Clayton Hall (now pulled down), formerly a residence of Humphrey Chetlam.

AFGHANISTAN.

(See Lord Dunmore's Map, page 19.)

By JOHN A. GRAY, SURGEON TO THE AMIR OF AFGHANISTAN.

[Addressed to the Members in the Memorial Hall, Wednesday, January 10th, 1894.]



DR. J. A. GRAY.

TO give you some idea of Afghanistan, I think I cannot do better than tell you what specially attracted my own attention when I first entered the service of the Amir. Afterwards one became familiarised with Oriental life, and so ceased to notice many things that would strike a new comer as interesting. I will, therefore, give you a brief description of the journey to Kabul—one's mode of life in different parts of the country, referring to the appearance and customs of the Afghans as the narrative progresses. To reach Afghanistan you take ship to Bombay; you stop at Gibraltar and Malta, go through the Suez Canal, the Red Sea, and across the Indian Ocean, landing in

Bombay on the 25th day. From Bombay you take the train to Peshawur, the frontier town in the north of India, and arrive there in about 3½ days. From Peshawur to Kabul the journey is made on horseback. Having obtained the necessary permit to cross the frontier from the Indian Government, we mounted our horses and rode out to Jumrood Fort, at the mouth of the Khyber Pass. We dined with the officer in charge, and as he had no sleeping accommodation for guests, we wrapped ourselves in our ulsters, and slept on the floor of the verandah. Next morning we found the Amir's guard—some forty mounted soldiers—waiting for us. Our baggage and tents were loaded on pack horses, and our servants—the most important of which were an interpreter and a cook—put upon spare horses, and at 6 a.m. we started.

This was in March, 1889. The pass is only open on two days in the week, Mondays and Thursdays, the Indian Government paying the Khyberis some £7,000 annually to allow merchants and travellers to pass unmolested on those two days.

The scenery in the Khyber is wild and rugged. One time you are travelling at the foot of the mountains, then you gradually rise higher and higher till half an hour after you find yourself winding round the spurs of the mountains, on a path cut out halfway up the face of the cliff, with a sheer drop of some hundreds of feet to the bottom of the ravine. The mountains are completely bare of vegetation, and in the summer riding through the Khyber is a wearisome and very hot business. After a ride of some ten or twelve miles you reach Ali Musjid, called the Key of the Khyber. Here there is a strong fort, which has been taken and retaken by the British and Afghans, but is now of course in the possession of the British. At Ali Musjid the road comes to the foot of the mountains, and there is a stream of water and a few trees. We halted; the servants gathered some sticks, made a fire and gave us tea. Then we rode on again. The pass opened out into a series of valleys. Here were two or three Khyberi villages, with cornfields round them. Each village is in itself a fort. It is built square, surrounded by a high wall, and with a tower at each corner, and is to be entered only through one gate. The wall is pierced for rifles. A great many of the Afghan and Hazara villages are built in this way. I have heard that it is not unusual, especially among the Khyberis, for one village to be at deadly feud with the next, so that there is a mutual interchange of courtesies in the way of robbery and murder. However, this sort of thing does not go on in the villages near Kabul.

At last we reached Lundi Kotl, a fortified serai belonging to the British. A serai is a walled enclosure where travellers and merchants can take shelter for the night with their

camels, pack-horses, and merchandise. This serai is very strongly fortified, and is generally in charge of a British officer. When we return from Kabul to India we are always glad to reach Lundi Kotl—we feel we are safely out of the country. We put up at Lundi Kotl for the night, the officer in charge giving us very comfortable quarters. The Amir's soldiers remained outside the serai. The next day we had to go through the Shinwarri country, and here the Khyber narrows up. We wound in and out round the spurs, and up and down as before, but the guard closed in round us and unslung their carbines, as the Shinwarries are not to be depended on. However, we saw no one. In spite of the presence of forty or fifty men, the sensation of silence and solitude as you are traversing a mountain pass, overshadowed by great rocks, is really remarkable. By-and-bye the pass opened out once more, and we rode through a series of small circular valleys, surrounded by rocky mountains. There was a complete absence of anything green, and in the summer the heat is dangerous; it seems to be reflected into the valleys from the rocks. Smoke-coloured spectacles are essential in a ride to Kabul, and the costume I found most suitable and most comfortable was a sun-helmet or a turban, a flannel shirt and a thick tunic, fitting rather loosely.

We reached Dakkha, the first station belonging to the Amir. The colonel commanding came out to salaam us, and gave us tea in a tent on the high bank of the Kabul river. Most enjoyable it was after the fatigue and heat. Then we rode on again through some hot pebbly valleys with no vegetation. We cantered for a while and the horse provided for me—apparently an old race horse—being excited by the clatter of the other horses, became unmanageable, and completely ran away with me. It was not a suitable place to be “run away with” in, being broken up by dry water-courses, and scattered over with rocks of different sizes, and pebbles. I soon distanced the others, and far behind was the captain of the guard clattering along, shouting “Khubardar” (take care)—the one wish of my heart was to “khubardar.” The old mare cleared the smaller valleys at a bound, and went into and out of the bigger ones before I had time even to choose a soft place. However, I pulled her up before she fell with me, re-adjusted the saddle, and waited for the others. They told me it was very dangerous, and I ought not to have done such a thing, as though it had been a piece of eccentricity on my part.

We reached Bassawal; tents were put up, guards stationed, and the servants made fires to cook our dinner. The fires were made some little distance from the tents, and we were not allowed a light in our tent, lest the Shinwarries should take a

shot at us, so we had dinner in the dark. It was my first experience of a night under canvas. Nothing happened. Next day we rode on to a place called Chardeh (four villages) and camped there. An Afghan Khan, or gentleman, arrived, having been sent by the Governor of Jelalabad to welcome us.

The following morning they woke us as usual before day-break; the tents were struck and the baggage loaded up while we were breakfasting. We had camp chairs and a little portable table, but its legs got bent, and our enamelled iron plates had a way of sliding off, so we generally used a mule trunk. We sent the baggage off, and started ourselves about an hour afterwards. We went through a series of fertile valleys, with corn-fields and fruit trees, across a dry plain to the mountains again, along the side of the Kabul river, on an excellent mountain road made by the British during the Afghan war. There is, in fact, a British road all the way to Kabul, though it is, or was, sadly in need of repair; but the natives have a way of taking what they think to be "short cuts" down an awful pass to the valley below, and then up another equally awful on the other side; they do this rather than ride a further distance in and out among the spurs of the mountain on the level British road.

As we were descending the mountain we could see in the distance the great Jelalabad plain, and the walled city of Jelalabad. I daresay you remember how that in the retreat of the British army from Kabul, in 1837, Dr. Brydon was the only man who reached Jelalabad. No doubt you have seen the picture by Lady Butler; it gives a very good idea of the look of Jelalabad.

We reached Jelalabad, entered one of the massive gates, and rode through the bazaars to the palace. Here the Governor received us in state. He made me sit on the seat by him. A page boy waved a fan to keep off the flies. Crowds of people stood round. Sweets were brought, then tea and cigarettes, and a bouquet of flowers. After resting for a while, during which the Governor made many polite speeches, he asked me if I would like to see over the palace; he showed me all over it. Sir Mortimer Durand and the officers of the Mission stayed there. I daresay you have read the description in the papers. The gardens around the palace are large and well laid out with flowers and fruit trees—the scent of orange flowers was overpowering. The palace is a large square building; the big central room has a domed roof. There are English carpets and curtains, chairs, tables, bookcases, let into the wall, and vases and other ornaments. After taking leave of the Governor I was shown into a pavilion in the gardens where quarters were prepared for me. One of the Khans gave me a dinner and provided for my guard, servants and horses. He came in after dinner and had some whiskey with me—on the quiet. I won't mention his

name. He has considerable power in the neighbourhood of Gundamuk, and I was advised to remember him in case it should ever be necessary for me to escape from Kabul. One could reach Gundamuk in a day, though it would be rather a big ride. The following day the Khan rode some distance with us; we put up at Tattang, where the Amir has a powder factory; they showed me over it, and another Khan gave me a dinner. He also had some whiskey with me. Next day's march was hot and the glare was intense; fortunately it was a short march. We went through a stony desert and over pebbly mountains to the Nimla gardens. The Mission stopped here too. The garden was made by Shah Jehangir and repaired by the present Amir. There is an avenue of cypress trees 130 feet broad with a stone-work water-channel down the middle, 12 feet broad with three cascades. There is a pavilion at one end of the avenue surrounded by flowers. Here I put up for the night. We started off early next morning through more stony valleys and over mountains. On the south was a great range of mountains called Suffete Koh, or white mountains, on the other side of which is the Kurrum valley. We passed Gundamuk and rode on to Surkh-Pul, or the red bridge. This is an ancient brick bridge built over the River Surkhab (a branch of Kabul river), which comes roaring through a gorge in the mountains. The water of the river is red or rather dark brown, from the colour of the mud in suspension. We boiled some of it and had tea; then went on to Jigdilik. In 1837, during the retreat of the British army from Kabul, out of 16,000 who left Kabul only 300 reached Jigdilik. We came down the long winding gorge, then climbed the mountain, on the top of which is the Jigdilik serai, where we stopped for the night, 6,200ft. above the sea.

The scenery all round is wild and desolate in the extreme; it was cold and miserable in the serai, and I wished I was back at home. However, they found me a room over the gateway, made up a fire, and got my dinner ready. After that and a pipe I felt more happy. Next day's march was over desolate and barren mountains to Sei-Baba—a valley of pebbles with a small stream running through it. In the middle of the valley is a tomb. When we arrived we found a small party of peasants on the tramp; one had died just as we arrived. They came to me to know if I would give a "winding sheet." There were no villages or houses within eight or ten miles. The following day we climbed up and up over the Latabund Pass (8,000ft). This always seemed to me the wildest part of the whole march; the mountains are so huge and rocky, the ravines seem so unfathomable. The road is on ledges of rock high up. On the highest peak of the mountains is what looked in the distance like a flagstaff. When I got nearer it seemed like a birdcage on a long pole. I found it was a huge iron cage fixed on a

mast. Once there was a man in the cage. His bones or their dust may be their now. It seems that the road some eight years ago was infested with robbers. The Amir determined to make an example of the next man he caught. It was the man in the cage.

From this pass you get the first view of Kabul. In the distance it seems a beautiful place, and after the long desolate march, the sight of it lying in the green Kabul valley, is delightful. We reached the foot of the mountains, put up at a place called Buthak, and the next day rode into Kabul. This is about 6,000ft. above the sea.

The tomb of Timour is a domed building, and is the one good piece of brick building in Kabul. Behind, in the distance, is Bala Hissar, formerly the Residency where the Royal Palace was. It was here that Major Cavagnari was murdered. The palace is in ruins now. There is a part left standing to the right of the Bala Hissar gateway. It is used as a prison for women. This is a nearer view of the gateway. There is one other ancient building that is of interest; it is the tomb of Babr Badshah (King Babr). It is an enclosed garden on the slope of the Sher Derwaza mountain, just outside Kabul. Babr, you will remember, was the great King who founded the Mogul Empire in Hindustan. He was a descendant of Timour or Tamerlane; he lived in the year 1500.

From the brief description of the journey to Kabul you can form some idea of the general appearance of Afghanistan. Four-fifths of the country consists of rocks and mountains. The mountains are not of very great height; they vary from 15,000 to 16,000ft., except the Hindu Kush range, which is over 20,000ft. The other fifth of the country, however, is exceedingly fertile. You come upon delightful valleys, where are gardens, orchards of fruit trees, apples, pears, peaches, almonds, great stretches of vines, melons, and pomegranates. Then there are fields of corn, barley, rice, and maize; patches of brilliantly green clover. The peasants are exceedingly clever in the art of irrigating. They will bring water great distances in most ingenious, though roughly-made aqueducts. When they can obtain water, the great heat of the sun enables them to reap two crops of corn in the year.

Away to the west and north-west, where the heat is less and the rain more, and especially among the mountains in the Hazara country, there are large stretches of grass. These are the pasture lands for the flocks of sheep, and herds of camels and horses belonging to His Highness and the richer Afghans. Many of the Hazaras are (or were) very rich in herds of camels or in horses.

The Afghans and the Hazaras are quite distinct races. The Afghans are tall, big-boned men, with regular features, large

eyes and full black beards; they are warlike and quarrelsome, but unless they are roused to religious frenzy by the priests they can never fight a "losing" battle. The Hazaras are much shorter men; they are of the Tartar type; have high cheek bones, snall oblique eyes, and scanty beard. They are hard-working, peaceful people, that is unless they are roused by cruelty and oppression—then they fight with dogged persistence. Though undersized they are of great personal strength. Their duplicity is not so great as that of the Afghans; indeed, they have a certain simplicity which contrasts them strongly with their neighbours. They live among the mountains in the centre and north-west of Afghanistan, and have been more or less independent for generations. Tamerlane (or Timour) who lived in 1360 was the last monarch who subjugated them until the present Amir came to the throne. They are not the original inhabitants of the Afghan mountains, but are descended from a single tribe of Tartars (15,000 families) who were first settled in the country by Genghis Khan, the great Turkistan chief who lived in the year 1200, and who subjugated parts of Afghanistan, China, and Persia. They were divided into camps of 100 and 1,000—Sud and Hazar (the Persian words for hundred and thousand); the former were absorbed into the latter and only the Hazara remain. They increased greatly, and spread over the mountains of the west and north-west of Afghanistan. It is curious that they should have completely lost their original language; they speak an old dialect of Persian. Their Tartar type, however, remains, so it is impossible to mistake them. Both Afghans and Hazaras are Mohamedans, but the Afghans are Sunnis, and many of the Hazaras Shiahs (or believers in Ali), and these two sects are usually at bitter enmity—a fact that the Amir made use of in the recent Hazara war.

Further north, on the banks of the Oxus river, which separates Afghanistan from Russia, are Turkomans and Usbegs. The Turkomans were a Turkish race living to the south of the Thian Shan mountains (or central mountains), and in the eleventh and twelfth centuries they overran Bokhara, Armenia, Georgia. They are nomads living in tents, or in a sort of wicker-work wigwam, dome-shaped and covered with felt, called a "khirgar." The smaller houses in Afghan Turkestan are built on the same model. The khirgar can be taken down in an hour and loaded on a camel. The Turkoman is a bigger man than the Hazara, of rough manners and coarse fibre, seeming more or less insensible to pain or sorrow. This cold, insensible temperament contrasts strongly with the more amorous nature of the Afghans and Persians. Their wives are unveiled and work in the camps and fields, and produce also the Turkestan carpets which are so much admired. The men have a strong tendency to highway robbery. For this reason

when I was in Turkestan the Amir forbid my going more than a mile from the city. The Usbegs are a similar race—Tartars—flat face, scanty beard, slanting eyes. They have the same language (Turki), the same disposition, tastes, and ferocity as the Turkomans. They do not, however, lead a wandering life, but dwell in villages. The village life has brought out some contrasting points, so that the Usbeg may be compared to a townsman, the Turkoman to a countryman, the citizen and peasant.

Some miles before you reach Kabul you go along excellent roads, fringed with poplar trees, and the cultivated fields separated by irrigation ditches lie to right and left of you. We entered the Lahore Gate. The streets of Kabul are narrow and badly paved, and are generally crowded with people in their turbans and brightly coloured garments. The shops are small and open like stalls, having no front window. The bazaars—that is, the streets with shops in them—are roughly roofed over to keep out the glare of the sun. I think the first thing that strikes you when you enter Kabul, as, indeed, it does in nearly every native town in the East, is the general look of dilapidation and dirtiness.

For sale in the bazaars you see the native bread made in large flat oval cakes; mutton; tea from Bombay; sugar and candles; teapots, cups and saucers, and trays from Russia; cloth and cotton goods from India; cheap vases and lamps from Germany; Norwegian matches; old British uniforms and army boots; patent leather boots, and long Russian riding-boots; saddles and bridles—some from Lucknow and some made in Kabul from English leather. Their thread however is not good, so that the latter soon tear at the seams; shawls and a cloth called *ubra* from Cashmere are also to be seen. As regards the manufactures of the country, they are few. There is a thick woollen cloth of a brown colour called "*barak*," something like Irish frieze, made from camel's hair; this is used for coats. It is good stuff, for as they say in Kabul, "You can wear your coat for five years, have it turned, wear it five more, then give it to your servant." There is another brown cloth, made in the neighbourhood of Herat; it is something like alpaca. They make *durbar* coats of this cloth and embroider them with brown braid in most complicated and artistic designs. Then there are the beautiful carpets, made by the women of Turkestan, which are so much in demand in India. Leather shoes with turned-up toes; quilted and gold embroidered caps round which the turban is wound. The Kabuli ladies work these. The poorer people, the villagers and hill men, weave coarse cotton cloth for shirts and pyjamas, blue cotton cloaks and turbans, and make a thick white felted cloth. For the winter they prepare the soft sheepskin *posteens* which are

worn with the leather outside and the wool inside. A small one without sleeves costs half a crown; larger ones, five, ten, or fifteen shillings. A Kabuli rupee is worth a shilling. There are rupees and pice. Five pice make an anna which is a nominal coin, and twelve annas a rupee. There are gold coins from Bokhara to be bought, but they are not in circulation.

The living houses away from the bazaars are arranged to ensure absolute privacy. A high wall with one gate encloses a square; on the inner side of the wall the house is built, generally one storey high (sometimes more) with flat roof. There are no passages; a door leads from one room to another. In the open space is a garden with trees and a well (or tank) of water. The houses vary in size and completeness, just as they do in England. Some are very elaborate with balconies, coloured glass windows, and have beautiful gardens full of flowers and fruit trees. My house was of this kind; others have simply a paved yard with a well in the middle, no glass windows, and only shutters which push up to let in the light and air. This is very well in the summer when every one lives with the windows wide open night and day, but in the winter it is very inconvenient. As a rule they then open one shutter only and hang a piece of muslin over the open space—glass is very expensive. They keep themselves warm by means of a sandali. Over a charcoal brazier is placed a four-legged wooden stool; over this is thrown a large cotton wool quilt. The people sit round cross-legged, pulling the quilt up to their chin. Over the shoulders they throw a sheepskin posteen. The men wear their turbans night and day, and the women have a little embroidered polo cap and a shawl of some kind.

Situated on the banks of the Kabul river, where it emerges from the gorge between the Asmai and Shere Dirwaza mountains, into the Kabul valley, are the Amir's "workshops." These are extensive for a native prince. There is a small steam-hammer, a stationary engine, lathes, cartridge plant, and a minting machine. These were taken out by Mr. Pyne, the Amir's engineer. Trained Hindostani mistris or workmen are brought from India to work the machines, under the direction of Mr. Pyne and his European assistants. Many of the Kabulis, too, work in the shops. These, the townspeople, are not pure Afghans, but a mixed race of Afghan, Persian, and Hindostani. As artificers they are clever copyists. Give them a Martini Henry rifle, or a machine gun, they will copy it so that to the untrained eye the two seem exactly alike. I don't say, however, that the weapon they produce is as serviceable as the one of British manufacture. Similarly they will copy a carved oak chair. I saw one in the palace and asked His Highness if it came from England. He said "No, it was made in Kabul," but he showed me the one it was copied from which had come from

England; they looked just alike, dark carved wood with leather seat and back. When, however, they attempt to evolve an original design from their inner consciousness the result is unsatisfactory. They turn out a variety of things from the workshops—guns, rifles, cartridges, portmanteaus, and boots. The rupees were formerly struck by hand; the present coin is much neater and prettier, but it is worth, I have been told, a penny less in the bazaars. The Amir makes money in his mint.

When I reached Kabul (April 6th, 1889) I heard that the Amir was at Turkistan, where he had followed his rebellious cousin Ishak. We were taken to the palace to see the eldest Prince, Habibullah. He is about twenty-four and can speak a little English. I dare say you have seen his portrait in the *Graphic*; it was taken from a painting I did of him in Kabul at the Amir's request. I was very surprised to find the *Graphic* had a photograph of the painting. The Erg Palace, where we were taken, is a fort surrounded by a moat, and contains the treasury, the Amir's private stores, great ranges of kitchens, quarters for the pages and servants, and contains (besides gardens) three separate enclosures surrounded by high walls. In these are first the Amir's pavilion, next the harem serai, and third the official quarters of the princes. Each prince, however, has his own separate establishment in the city, where are his wives, servants, and horses. The Amir's pavilion is of quaint design. His Highness told me he designed it himself, but I think he got the idea of it from one of the churches in Tashkend. The design is, roughly speaking, that of a circle laid in the centre of a cross. The central hall is circular and domed, and four prolongations or alcoves lead at right angles from it. It is all one space; the alcoves are not cut off by doors. In one alcove or room is the entrance. In the opposite one the Amir sits on his couch. He has his writing table by him with paper, pens, and ink, though he never sits at it to write, but holds the paper in his hand. Persian writing is done slowly and from right to left. He has always great banks of sweet-smelling flowers round him, and generally a canary in a cage or a parrot. There is a large window at the end of each alcove opening out into the rose garden which surrounds the pavilion. The couch is a low one, and is heaped with silken cushions, or with furs if the weather is cold. The Amir has a charcoal sandali in the winter, and also a stove for wood in the central hall. A screen is arranged to cut off the draught from the door. The day I first went it was, as I said, to see the prince, the Amir being in Turkistan. We passed the sentries, walked through the gardens, and entered the pavilion. The prince and all the chief officers in Kabul were seated in a semicircle in the central hall, the prince having an arm-chair, the others

straight-backed chairs. Though orientals, none were seated on the ground, and all were in European military uniforms, with Astrakhan hats on their heads. The prince and the others shook hands with us, chairs were given us, and tea and cigarettes brought. While we smoked the prince made polite enquiries as to our health and whether we were fatigued with the journey. He spoke in Persian, the interpreter translating for us. By and bye I noticed the prince suddenly turn pale. I wondered why and kept my eyes fixed on him. Presently I was aware of a rumbling noise, the windows rattled, the doors opened, and the lamps swung. The prince suddenly rose and walked rapidly out into the gardens; everyone jumped up and followed. It was my first experience of an earthquake.

I was a month in Kabul attending the hospitals and seeing a great number of patients. They flock to a European doctor. There are two hospitals—an out-patient or general hospital, which is in a large building adjoining the Government offices, and an in-patient or military hospital, which is in the Cantonment of Sherpur. (This cantonment, you will remember, is the fortified enclosure that was held successfully by General Lord Roberts, with a comparatively small force, against the combined rush, one night, of the whole Afghan army of 20,000 men.) Then a message arrived from the Amir that I was to join him in Turkistan. The treasury officer was also going with a supply of rupees from the treasury. I joined him, and we started with a large guard of cavalry on May 16th. One night we camped on the Hindu Kush mountains. We had been riding for hours along the mountain paths, and then we camped on sloppy, melting snow. My tent had not arrived, so the treasury officer invited me into his. I took off my ulster, which was soaked with wet, lit a pipe, and sat on a camp-stool (with nothing to lean against), shivered aloud, and wondered why I was born. Presently, John Mahomed, the treasury officer, noticed that I seemed uncomfortable. He very courteously rose, took the big sheep skin posteeen off his own shoulders and placed it round mine. I tried to refuse. We neither of us could speak a word of the other's language, but he insisted. A soldier brought him a cloak, which he threw round him. Then they brought an iron pot into the tent and, after considerable trouble, lit a wood fire, piling it up with damp sticks. The smoke was awful. No one seemed to mind it but me; my eyes smarted and streamed with tears. At last I had to sit and smoke with my eyes shut. Well, I got warm eventually. We had camped near an Hazara village; the villagers were so poor that not a scrap of food was to be had. At last a few pints of milk were obtained; it was put into a pot over the fire, some water added, and a handful of tea thrown in and the whole boiled. John Mahomed and I (because I was a guest) had two teacupsful, the others one; this was our dinner.

My bedding had not arrived, so some straw was put on the ground, then carpet. I spread my waterproof sheet, rolled my coat up for a pillow, wrapped the posteen round me and went to sleep—or tried to. It was very uncomfortable. However, no evil resulted, except that my interpreter had an attack of fever that night. He got well next day. We made long marches, and as soon as we halted I used to lie on the ground and go to sleep at once. It was rather a trying journey; one time you would be crunching through the snow, an hour after you would be riding through a valley where sunstroke was a possibility. About half-way on the journey was the Bamian Valley. It was to this valley that Lady Sale and the other English ladies, taken prisoners in the first Afghan war, in 1837, were conducted. Happily it is a matter of history that they were brought back in safety. In this valley, cut out of the face of the mountain, are three colossal figures—a male, a female, and a smaller one, said to be a child. Some say that these are ancient Buddhist idols, and the caves in the rocks by the side of them temples and dwelling-places for the priests.

On the mountains, the other side of the valley, is an ancient Persian city, deserted. One comes across two or three of these deserted cities on the road to Turkistan; whether they are all Persian I cannot say. The Afghans say they are cities built by "Sekunder" or Alexander. The road is mountainous as far as Tache Kurghan or Khulm. We had a few dangers. Where the path was broken away we scrambled across on foot, the soldiers bringing the horses. Also in crossing a mountain called the "Tooth Breaker" you ride along smooth stone, slanting to a precipice of unknown depth, and descend a zig-zag path of smooth slabs tilted in every direction. However, the Kabul horses are very clever climbers and as hard as nails. At Khulm the road was washed away, and we had to ford three times a torrent—fortunately shallow—which was roaring at the bottom of the ravine. Then we got out into the open and the mountains ended. It was undulating ground like downs, with scrubby grass for some miles, and then flat dusty plain right up to the town of Mazar-i-Sherif, where the Amir was encamped. We did the journey from Tache Kurghan to Mazar in the day—nearly forty miles. It was intensely hot. We stopped four or five times while the servants boiled some water and made tea, and once at a Turkoman camp, and had tea in a wigwam or Khirgar.

At last we reached Mazar, crowds of people coming out to meet us. The house that was given to me is historic. It was the royal residence before the Amir built his present Turkistan palace. Amir Shere Ali lived there, and indeed died there, in the room that I occupied. It is a well-built house, situated in a walled garden, which is full of flowers and trees. It is raised

three or four steps above the earth, is one storey high, and has inner and outer rooms. There are coloured-glass windows, draped ceiling, white walls covered with sparkling particles of talc, and the rooms were carpeted all over with the beautiful Turkistan rugs. I was allowed to rest for a day, and on May 30th was taken to the palace and introduced to His Highness. The palace is situated in the middle of a very large walled garden full of almond trees and flowers, and it is just like a well-built bungalow such as you see in India. Mazar-i-Sherif is exceedingly hot in the summer, and His Highness was seated in an armchair in the veranda holding his durbar. Running across the gardens and in front of the palace is a stream of water three or four feet wide. The Amir, with the chief officials, the pages, and the guard, were on the palace side of the stream; the other people attending the durbar were on the further side. Everyone was standing excepting the Amir. When I was introduced I took off my sun helmet and bowed in the European way. Then I was taken across the stream and a chair was given me. The Amir spoke to me for some minutes, making the usual polite inquiries as to my health and hoping I was not fatigued. His Highness is a man of presence, broad and stout. He is fair-skinned, sunburnt, with black hair and piercing eyes. He was dressed as a European in semi-military costume. His manner is dignified and courteous. He can, however, if occasion arises, be exceedingly fierce; not the most powerful Afghan chief dare come near to him uninvited, nor dare he speak or sit in the Amir's presence without permission.

I soon got to work in Turkistan. I found remittent fever was simply decimating the troops. The mode of treating the disease adopted by the native physicians or hakims was irrational and most unsuccessful, so that I had six months very hard work all through the intense heat of the summer.

There was a man, named Allah Nur, whom I found with disease of the elbow-joint; it was incurable, and I said the arm must come off. Allah Nur, though he was very ill, was alarmed at this. He made his escape from the hospital, got on a donkey, and had reached a place called Takht-a-Pul, about seven miles away, before he was captured. They took him before the Amir. His Highness called for a probe, examined the joint, and said, "Decidedly the arm must come off." The man fell on his knees and said, "For God's sake no!" The Amir reached out his hand and boxed his ears. Then he sent for me, and advised me before I operated to give the man port wine and to feed him up as he was weak. The advice was good, but the next day I found the flies had got to the joint and I amputated the arm at once. The patient recovered rapidly, the wound healing in eight days. I took him before the Amir and received His Highness' congratulations. This was my first surgical operation in the country.

The summer coming on, I had to go to the hospital at daybreak to escape the heat. The hospital, by-the-way, was a large garden or orchard, and the patients were in beds under the trees, or, when we were very crowded, they lay on the grass. The climate is excessively dry and there is no dew.

At the end of the summer, when the work was nearly over, I got the fever and was ill for some time. The Amir was exceedingly kind. Hearing that I did not care for the food I could get, he ordered anything I fancied to be sent from his own kitchen, and, as he had an excellent cook (a Hindostani), I did exceedingly well. I had beef tea, jellies, puddings, port wine, fruit, and so on. He paid me a royal visit by deputy, sending his chief secretary (he has no ministers). And finally, he presented me with the Izzat medal for the work I had done among the soldiers. It is somewhat of a curiosity, inasmuch as it is the only one of the kind that has been struck.

On September 15th, 1889, the youngest son of the Amir was born—Prince Mahomed Omer. According to Afghan custom, he is the rightful heir to the throne. He is of royal blood on both sides, his mother, the Sultana (or chief queen) being the Amir's cousin. The Sultana's father was a Sayid or holy man. He was of the royal tribe of Suddozye (the last reigning representative of which was Shah Shujah), and he demanded the daughter of Amir Dost Mahomed in marriage. He was a priest and therefore a beggar. The king, however, consented and the present Sultana was their only child. The Amir himself is the grandson of Dost Mahomed, who was chief of the rival royal tribe, the Barakzais, so that little Prince Mahomed Omer unites in himself the two royal houses of Suddozye and Barakzai. He is, therefore, a formidable rival to Prince Habibullah, the Amir's eldest son, whose mother was a slave woman.

Prince Mahomed Omer is a bright-eyed youngster, singularly like the Amir in appearance and in his way of speaking. His Highness says the boy has the "royal manner." Prince Habibullah, who is about twenty-four, is an intelligent man of a kindly temper. He governed Kabul for two years while the Amir was in Turkistan. It was an important and difficult post, and I have heard that the people were delighted with his just and mild rule. He is, however, somewhat of a weak character, is easily led by favourites, and unfortunately he stammers in his speech. The Sultana, on the other hand, is a determined woman of very strong character, so that, in the future, there will probably be a severe struggle.

I got rid of the fever on Christmas Day. I was called then to see one of the page boys. I found him living in a Turkoman khirgar in the palace gardens. His horse had dashed him against a tree and broken his thigh. While I was setting the thigh I noticed the scar of a bullet: enquiring the cause I heard

the story of the attempt on the life of the Amir, which took place the year before. The Amir, they said, was seated in an armchair, out on the plains, reviewing the troops. As an Herati regiment was passing one man stepped out from the ranks and fired at the Amir. The bullet was well aimed, but just as the man fired the Amir, who was smoking a cigarette, leaned over to speak to someone who was sitting on the ground by his side. The bullet went under the Amir's arm, through the back of the chair, and into the thigh of the page boy. The Amir did not stop smoking his cigarette, and he finished what he had to say. They rushed up to cut the man down; then the Amir shouted to them to stop—too late, however, and the man was killed before he could say anything. The Amir wanted to get to the reason of it all. He could not see why a private soldier should want to assassinate him. He never got to the root of the matter, but he dealt with the officers of that regiment very severely.

After I had set the boy's thigh, I went on to the durbar (or reception) at the palace. The Amir congratulated me on my recovery, and when the durbar was over invited me to lunch with him—this was about midday. His Highness had a table to himself, and I a small table in front of him. The other officials sat on the ground. The lunch was cooked in the native style, and consisted of pilau, stews of various kinds, hard boiled eggs, puddings, cheese, and fruit. A sardar or noble of the Amir's tribe waited upon His Highness and, on this occasion, also upon me. The Amir made some polite and complimentary speeches to me, and asked me to vaccinate the little Prince Mahomed Omer as soon as he was old enough. A day or two afterwards the Amir caught a severe cold; I was sent for and spent several hours daily at the palace, lunching and dining with His Highness. I got to know him much more thoroughly than I had done before. I found him a well-informed and most entertaining man. He sat on his charpoy, or couch, wrapped in a gorgeous silk robe, with a small white turban on. Pages with velvet and gold tunics were grouped about. A few of the chief officials were seated on the ground round the room. I had a chair and sat smoking cigarettes while the Amir told me stories of his adventures in Russia when he was an exile. He told me of the new Kabul that he hoped to build, the action of the native drugs, the customs of Afghan hillmen; then he widened his field and discoursed upon all sorts of subjects, some of which he had but a superficial knowledge of, but it was all done with such courtesy and dignity that it was impossible to do other than agree with him whatever statement he made. His people were profoundly impressed at the extent of his knowledge, which is, I fancy, what he was aiming at. One custom he has which strikes one at first as eccentric—it is that

he takes out his artificial teeth in open durbar, cleans them with a tooth-brush and then replaces them (all his teeth are false); but when you come to think over the reason of this mannerism, it strikes you as simply a part of the scheme to impress his people. They, especially the villagers and hillmen, are profoundly ignorant; they don't know that there are such things as "false teeth," and when they see before them a king who can take himself to pieces they stand aghast. I think, too, this wish to impress his people is one reason why he is fond of employing Europeans. He says, "These *feringhas*, who possess all the knowledge and all the wealth of the world, they are *my* servants—the servants of your king!" And the machinery:—the people call the "workshops"—"en-gin!" A gin means in Persian a "devil," and they see these horrible-shaped things, which make cartridges and money, sometimes clutch hold of a man and break his bones, or kill him, and they are profoundly impressed at the power of the great king, whose servants these monsters are.

The way the Amir's taxes are gathered is ingenious and essentially Oriental. A court official is made Governor of some place on a small salary—£10 or £15 a month—but presently he blossoms out into a sort of small Rajah. He heaps up wealth, keeps crowds of servants and horses, and dresses in velvet and gold. This goes on for a year or two, then he is recalled to Kabul to make out a statement of his accounts. His ill-gotten wealth is put in the treasury; his finery, and the shawls and diamonds of his wives in the Government stores, and he is punished severely for oppressing the people; and so everyone is satisfied. His Highness has some wonderful and valuable things in his stores—vases, diamonds, and shawls, and many things you would not expect; for instance, a telephone and a tricycle. One evening, when he was telling me stories, I stuck my pocket-knife into the stump of my cigar to hold it; the Amir asked, "Hadn't I a cigar holder?" I said "No." His Highness spoke to a page boy, who went out and presently returned with about a dozen cases. The Amir chose two, which he gave me—meerschaum and amber.

One morning I was called at six o'clock to vaccinate the little prince. Why they wished it done before daylight I don't know. The servants got me some tea ready and I started, accompanied by one of the chief hakis. The prince was not in the harem, but in his own house; he was four months old, but he had his house, his wives, horses, and signet. Infant marriages are not the custom in Afghanistan: these were "political" wives. We passed the sentry at the gate and walked across a square garden. It was January and there was snow on the ground. Mazar, though intensely hot in the summer is equally cold in the winter. In the room, which was carpeted and curtained, was

another hakin or physician (a very aged man), also a young nurse and two old ones.

These ladies, contrary to the Mahomedan custom, were not veiled, and the younger one was nursing the little prince. He was a healthy-looking baby, with dark eyes and hair and a fair skin. The nurse, too, was fair-skinned. She was dressed in loose Oriental trousers, a long white vest or robe reaching below the knee, a little crimson jacket, and a round embroidered cap, like a polo cap, put a little on one side of her head, and she had a cashmere shawl over her shoulders. She asked my interpreter to enquire if there were any women in England as beautiful as she? The old ladies rebuked her. I had no trouble in vaccinating the prince, and in a day or two we became excellent friends. He would sit on my knee or let me carry him about the room. One day I remember he was laughing as I said good-bye. Immediately one of the old ladies followed me out and begged a hair from my head, so that no evil should result from my having left him while he was laughing; the hair was burnt with due ceremony. At this time I had to vaccinate also all the little page boys or slaves who were to be the prince's attendants.

The slaves in Kabul are simply prisoners taken when some rebellious tribe goes to war with the Amir. As a rule they are treated exceedingly well; sometimes you cannot tell which is a man's slave and which is his son. The Amir has placed several of his favourite slaves in positions of great trust.

As my professional work became less severe, I amused myself by painting the portrait of my next door neighbour—one of the chamberlains, and I also painted my own portrait. The Amir hearing of it sent for the pictures. He honoured me by approving of them, and then requested me to paint his portrait. On January 24th I began it. The studio was simply the durbar hall at the palace, and I had to take the light as it came. The Amir was an excellent sitter. When I began the portrait I had a crowd of officers, secretaries, and pages round me. After a sitting or two, when the novelty wore off, some of them began to offer criticisms. The Amir told them to talk about things they understood, and not to make fools of themselves before an Englishman. The likeness was satisfactory, and one day I sent for the painting to my house to varnish it. There were some patients waiting (soldiers and peasants); when the portrait was being carried in they all rose and salaamed; they did not know what a painting was. The Amir was pleased with the portrait and made me a valuable present.

Near me lived another of the Amir's sons, little Prince Hafiz Ullah. He was a fair-haired youngster of about ten. I often went and had a cup of tea and a chat with him and his tutor. One day he took me with him to see some wrestling matches

between the Mazaris and the Turkomans. The wrestling was to take place in a large garden or park, called Charbagh. The prince was carried in his little palanquin or chair, and I walked by the side. A guard of foot soldiers marched in front and behind. The people in the bazaars salaamed as we went by. There is no shouting or cheering in the East on these occasions. We passed the great Mosque or Mazar, from which Mazar-i-Sherif takes its name. It is a big building with a domed roof decorated with blue tiles. In it is the tomb of one of the descendants of the Prophet.

In the Charbagh a large open space was prepared, with a raised platform at one end. Here, under an awning, sat the prince, some officers, and myself, the attendants standing behind. The open space was surrounded by crowds of Orientals in their turbans and gay-coloured dresses. Before the wrestling began there was a dance by the soldiers of a Kandahari regiment. In the centre sat the musicians playing their native instruments—drums and sort of flageolet—which gave a sound resembling that of the bag-pipes. The rhythm of the music was curious, quite different from that of European music. The soldiers formed a ring and started with a slow-step, something like a mazurka step, singing a chant. Presently they went quicker and quicker, and seemed to work up at last to a pitch of frenzied excitement, uttering sharp yells and whirling round and round. It was a striking and really quite a stirring sight.

Then the wrestlers came on: they were barefooted, had a long, loose coat, unfastened, with sleeves, and a skull cap. They faced each other and warily sidled round and round; suddenly they rushed forward, each seizing the other by the elbow and collar, and the wrestling began in earnest. I gathered that it was necessary for one to throw the other so that both shoulder blades were touching the ground before he could be considered conqueror. The Turkomans were immensely strong men, and none of the Mazaris could stand against them.

The prince therefore pitted the Turkomans one against another, and the wrestling grew more interesting. Before the prizes were distributed, the Kabulis gave a display of their style of wrestling. They were nearly nude—had simply a waist cloth. How they grasped each other I don't know. It was very quick and very pretty wrestling, but it was play; they did not compete. They offered to wrestle the Turkomans in the Kabuli fashion, but the Turkomans said "No, we will wrestle you our way," so nothing came of it.

The prince distributed the prizes to the winners. They were long coats, of bright colours, such as Turkomans and Mazaris wear. Then tea was brought us, bands played, and we went off home again.

One day my interpreter took me in to my next door neigh-

bour's for a game of cards. I found one of the page boys there ; he was studying Euclid. However, he gave up his book readily to help teach me cards. They played a sort of three-handed whist, without dummy. I learnt the game, but I have forgotten now how it was played. The cards are precisely the same as ours ; they were made in Germany.

On June 13th, 1890, His Highness left Turkistan and started with the army, the court, and all of us for Kabul. We camped the first day on the plains, a few miles from Mazar. The heat was intense. They gave me a little iron chair to sit on while my tent was being put up, but the chair became so hot that I had to stand. There did not seem to be a breath of wind. I was the only European in the camp, and I thought I should certainly get sunstroke. At last my tent was up, but being put up on the hot earth, about midday, it was like an oven. The Amir sent me some ice pudding. I ate it quickly before it was all melted, and lay and gasped on my charpoy or bedstead. An ice pudding was not the most wholesome thing to eat under the circumstances, but you can understand one's eating it if you have ever suffered from a tropical thirst.

After that we travelled at midnight to avoid the heat. It was pitch dark ; some of us lost our way on the plains. At dawn, one day, the Amir found himself wandering off towards Russia. We had all sorts of adventures, which seem amusing enough to look back upon, but were anything but amusing at the time. One night we had been riding and riding till I thought my back would break ; I turned round to growl at my interpreter and found that he and I, and a soldier, were alone. I refused to go further, so we got off our horses. We found a stream or a ditch of some kind, scooped some water up and drank it. I do not know if it was muddy or not ; we could not see. I think we should have drunk it if it had been poison, we were so thirsty. We lay on the ground and went to sleep, the soldier holding the horses. I rolled my revolver up in a makintosh and used that for a pillow. I was woke up suddenly by hearing a terrific scream. It was day-break ; a lot of soldiers who had followed us were lying around, and two horses were fighting furiously. They were screaming and biting, and striking each other with their fore-feet. It is astonishing what a huge animal a horse looks when he is standing upright on his hind legs and you are lying on the ground. We soon jumped up and got out of the way. Then we rode on till we found the camp. I became ill on the march, and the Amir sent me his elephant to ride. I was rocked along in the early mornings before the troops started. There were several accidents, of course, on the mountains among so many thousand people. There were seven or eight elephants and many thousand horses and camels. The elephants were rather a nuisance to the army ; they went so

slowly.—They would block up a pass so that the soldiers would have to sit for a couple of hours or so in a small valley, jammed in among kicking and screaming horses; some of them had their legs broken.

The Amir and his guard started some hours after everyone else had gone on. The Sultana, the little princes, and the harem were a day in front of us. Before we reached Kabul the Amir sent me his palanquin to ride; the bearers went along at a great pace. We arrived at Kabul on July 24th, the journey taking forty days.

The formal reception of the Amir was at a place called Baghi-Buland, a few miles from Kabul. It is a hill covered with vines, fruit trees, and flowers. A pavilion was erected there. The two eldest princes, who had remained in Kabul, came and kissed the Amir's feet, and all the chief officials who had been in Kabul also came to salaam His Highness. A salute of guns was fired and the Kabul troops paraded. I did not wait till the end of the ceremony, but was carried on to the house the Amir selected for me in the city. I got better in the autumn and then the Amir was taken ill. I was called to see him on December 2nd, at nine o'clock in the evening. The Amir was exceedingly ill; he had had gout for some time, and the hakims had not only put his foot into ice and water but had bled him and leeches him till his life was in great danger. I did not leave His Highness' room for five days and nights; he rapidly improved under European treatment. After that I was moved off to the princes' quarters, visiting the Amir two or three times a day. Just then the Sultana was taken ill, and the Amir ordered me to attend her in the harem. I was conducted into a paved quadrangle with large white buildings all round; no one was to be seen except the old man who led me in. I was taken up some steps into an anteroom, curtained and carpeted, but with no furniture, up some more steps into a large high room. This was well furnished, very much in European fashion—chairs and tables, china vases and ornaments, candelabra, curtains, and so on. Across the end of the room there was stretched a thin crimson silk curtain. One or two little page boys, aged about nine or ten, were in the room. When I entered a voice from behind the curtain bade me welcome. It was the Sultana speaking. I bowed and went forward, answering Her Highness in Persian. A chair and a small table were placed and tea and cigarettes brought. I made enquiries as to the health of Her Highness, examined the pulse, Her Highness raising the curtain sufficient to put her hand through. I noticed that the hand was very white and was that of a young woman. I gave her the clinical thermometer and found she had considerable fever. After staying a short time I asked permission to retire, then bowed and left. I had to visit her several times

during the next few days. Her Highness showed me her album of photographs—among them she showed me a portrait of the Amir when he was young—her hats and bonnets, which were English, and two or three most gorgeous crowns of beaten gold, set with great yellow diamonds.

The Sultana recovered and the Amir also. I was treated with great kindness, and received valuable presents from both of them. When the spring came I left the palace and went back to live in my house.

The Amir requested me to paint the portraits of the two eldest princes. When they were finished I left Kabul for India, bearing with me a letter—not a political one—from His Highness to the Viceroy, Lord Lansdowne.

I delivered my despatches and dined with His Excellency; I had the honour of meeting Lord Roberts and many of the officers who had been in the Afghan war, and then I returned to England. After six months in England, I went out again to Kabul. I remained two years, and then family affairs compelled me to resign His Highness' service, and I came home this summer.

The following makes an interesting addition to Dr. Gray's address. From *The New Weekly*, February 17, 1894. By permission.

THE AFGHANS.

THROUGH the courtesy of Sir T. S. Pyne, C.S.I., the Amir's agent, we are enabled to place the accompanying portrait before our readers. Mr. Pyne's plucky acceptance of service with Abdul Rahman was a fortunate thing for his country. He has been the means of promoting a cordial understanding between England and the Amir, which was no inconsiderable feat, and he has also secured a good customer for many of our manufacturers, especially for some of those in the Midlands. Mr. Pyne may be congratulated on the fact that he will be enabled to retire on something more substantial than laurels in a briefer period than Anglo-Indians usually require.

Seeing that he has for seven or eight years carried his life in his hand in the midst of a fanatical population, it may be averred that any monetary reward is insufficient. His French predecessor at Cabul soon grasped that fact, and promptly retired from the country before a bayonet was inserted between his ribs by some devout Mussulman, whose creed holds it meritorious to make war on unbelievers. Mr. Pyne waxes merry when he refers to our ignorance of the geography of Afghanistan. A letter from a British manufacturer addressed to him "Cabul, South Africa," was not so bad as that of one of our leading illustrated weeklies which put the Hazara country—where the Amir has had some trouble lately—in the middle of the Punjab, five hundred miles distant. It may be remembered the Hazara rising was one of the causes which prevented Abdul Rahman meeting Lord Roberts at Jelalabad this time last year. At least the Amir advanced it as such, though the well-informed prefer to believe that the size of Lord Roberts's escort had more to do with the evasion of the meeting.

In the interview which our correspondent had with Mr. Pyne many interesting facts concerning the manners and customs of the various tribes inhabiting the country were gleaned. His unique and somewhat risky position precludes him from touching



SIR T. S. PYNE, K.C.S.I.,
AGENT AND ENGINEER TO THE AMIR OF AFGHANISTAN.

(By permission of the Proprietors of *The New Weekly*.)

on the habits and persons of the Amir, his family, or the high officials ; he speaks well of the way he is treated by them. It is, however, fairly certain that outside the cities and the routes from Peshawur to Cabul there has been little change in the

character of the people since our peculiar countryman, Durie, travelled all through Afghanistan a century ago without clothes or money, save what the Afghans gave him, and only escaped violence by promising to be circumcised when he arrived at Cabul.

Now, as then, they are polygamous, the number of wives being governed by their means and their ability to purchase the females. It is also incumbent on the brother of the deceased to marry his widow or widows. The people being generally poor, one wife is usual with the lower orders. In towns the women go about with their heads covered by a hood having a network front; this custom does not obtain much in the country. The men and women live and eat together, except at parties. Their visitors, pleasures, and all meetings are apart. Generally speaking, the women are virtuous. There are, however, some exceptions. The Hazaras, for instance, are very dissolute. This tribe, which has had a "rising" recently, is a very irritable one. The members of it are constantly quarrelling with their neighbours. They are called Hazaras from the large number of Taifa, or tribes, into which they are divided (in Persian Hazar means one thousand). They are great athletes, and their constant amusement is wrestling, or riding races down the face of a steep hill—the steeper the better—at headlong speed. As shots they are well known; any man of the tribe not being able to shoot an apple lying on the ground or a cowrie shell as he passes it on horseback at full gallop is reckoned of no account. In the Hazara country a peculiar kind of wheat, twice the size of the ordinary grain, is cultivated, and from its shape is known as camel's tooth. Like the Swiss, they yodel.

As the Afghans pray five times a day they are a religious people; indeed in the towns regular prayer once daily is enforced. There is nothing, however, to prevent a man saying his prayers the other four times when he is in company or at work and interjecting remarks to keep up the current of the conversation while he is so engaged. Before embarking on any venture, piratical or otherwise, the pious Afghan repeats the first verse of the Koran, as he does on his return, and always adds "please God" to any statement of his intentions.

In Cabul, which by some is supposed to signify Cain, the superior classes pass much of their time in their gardens sitting on carpets listening to their own musicians playing on the saringi or guitar, or gossiping over tea. These gardens are surrounded by high walls, usually of mud, and have raised walks, along which flowers, notably stocks, are grown. All kinds of fruit and vegetables grow in great profusion, seven pounds of grapes being considered expensive if they cost more than a penny. Occasionally the wealthy classes drink wine, but women are then excluded. Games of chance are not allowed, but fighting rams or camels are popular. As a people they are hospitable (the case of Durie is a striking example), and make it a point to protect a guest or person who throws himself on their mercy so long as he is in their village, but as soon as he leaves it they have no scruple in robbing him. In the towns the houses of the poor usually contain only one room, entered by a small door, on the roof of which, made of mud, is a terrace surrounded by a wall sufficiently high to prevent neighbours seeing over; generally the floor of the room is covered by a rough carpet and felt to sit on. In winter at Cabul 40 degrees of frost, Mr. Pyne says, is not uncommon, but there is a total absence of fog. The climate he prefers to our own, and he thinks it is better than that of Cashmere. At the commencement of the cold weather the Amir meets all his high officials in his bathroom to eat the Hulym—a dish composed of wheat, mutton, sugar, and some kind of grease mashed up together.

As may be gathered by the different manufactures started under Mr. Pyne's supervision, the people in Cabul, at all events, are coming nearer to our standard of

civilisation. The nobles are too refined now to play such pranks as Dost Mahomed used to indulge in seventy years ago. Dost had no scruple in breaking into the harem and chasing the Amir's sister into a bathroom so as to rob her of the waistband of her pantaloons because it was embroidered with pearls. Not alone is the zenana held sacred, but every man's house also, no matter how poor he may be. An instance of courtesy now affected by the high officials shows what a great change has come over the inhabitants of Cabul. When the Amir's Commander in Chief, General Ghulam Haider, was asked by Sir Mortimer Durand what time he would like the mission to start each morning on its journey to Cabul, he replied: "Sir, my orders from my master are that I am to carry out your wishes. The fulfilment of your wishes thus becomes my duty and my pleasure." While the General was playing the courtier, one of the tribes at Deekal broke loose, looted some of their neighbours' goods, and killed several. Ghulam Haider has now gone with a couple of regiments to chastise them. He is a man of about fifty years of age, of immense proportions, and gorgeous in raiment. When photographed with the mission he wore a frock coat of white and gold.

The Siberian Railway.—An important decision was taken at the last meeting of the Committee of the Siberian Railway. The great highway from Siberia to the Amur is passing now, as is known, round Lake Baikal, a narrow road having been cut through the cliffs, which rise from the very edge of the lake to a great height. The cost of the railway from Irkutsk to Transbaikalia, round Lake Baikal, is estimated at no less than £2,500,000, and the construction of this part of the line would undoubtedly take a great deal of time. It has been decided, therefore, to build at once the line (53 miles) between Irkutsk and Listvenichnaya, on Lake Baikal, and to establish between this port and the opposite shore of the lake a regular communication by means of steamers, specially built for the purpose, which would thus connect the Middle Siberian trunk of the railroad with the Transbaikalian during eight months of the year; while during the winter there would be no difficulty in establishing a temporary railway on the always very smooth surface of the thick ice-cover of the lake. At the same time, the success of navigation up the Yenissei has proved that the rails and other heavy materials for the railway could easily be brought from Europe via the Arctic Sea, up the Yenissei, and up its tributaries, the Chulym and the Angara, which could be easily improved for navigation at a slight expenditure. It has been decided, therefore, to build at once the trunk-line Achinsk-Krasnoyarsk (113 miles), which will connect the two great arteries of navigation, the basin of the Ob with that of the Yenissei, and facilitate the construction of the line from Krasnoyarsk to Irkutsk. The same committee announce that on the first West-Siberian line, between Chelyabinsk and Omsk, eighty per cent of all the earthworks have been accomplished, and the rails have been laid over a distance of 160 miles out of 495 miles. On the second division, Omsk to the Ob (326 miles), as well as on the third (Ob-Krasnoyarsk), work is in full swing. As to the Usuri line, it is announced that the first 67 miles, between Vladivostok and Nikolskôye, are opened for both passengers and goods traffic.—*The Geographical Journal*, January, 1894.

SIAM AND TONQUIN.

(See Map.)

By the RIGHT HONOURABLE LORD LAMINGTON.

[Addressed to the Society, at the Manchester Athenæum, Friday, October 27th, 1893,
at 7-30 p.m.]

PUBLIC attention having been recently directed to Indo-China, some excuse may be found therein for my venturing to appear before you. It happened that, excepting Lieut. Younghusband, I was one of the first Europeans to pass right through as an unprejudiced traveller, and was the first European to cross from the Mekong river to the Black River in Tonquin.

You must be all now more or less acquainted with the geography of Indo-China, but I may be allowed to point out the general configuration of Siam.

In the Malay Peninsula, our colony of the Straits Settlements and our Native Protected States form her boundary; passing northward, Lower and Upper Burma lie on her western frontier; and to the north-west and north are the Shan States, which came under our control when we acquired Upper Burma. This frontier has only lately been delimited, and as a result of negotiations we handed over to the Siamese the state of Kyang Kheng, which lies on either side of the Mekong. Where we and Siam part as neighbours the Sibsong Pana (the suzerainty of which is not decided, whether it be that of Burma or China) continue the frontier line on the north until the French possessions of Tonquin are reached. I will not attempt to argue the vexed frontier question here. It is enough to say that, broadly speaking, the water parting between the Mekong and Black rivers, and the mountains stretching down the whole length of Annam, have hitherto by tradition been accepted as the boundary between Siam and Annam, and for the last 100 years the country on the western slope of the mountains has been under Siamese jurisdiction. Further south, by the Mekong delta down to the sea, Cambodia continues the frontier line. Omitting from consideration the states in the Malay Peninsula which are outside the general configuration of Siam, the most clearly marked features on the map are the two great river systems of the Menam and Mekong, which traverse the country from north to south.





BANGTAPHANG.

In four days a steamer from Singapore conveys one to Bangkok, the capital. Bangtaphang, a small village on the Malay coast, is usually called at *en route*, as gold mines have been started in the neighbourhood, but the deficiency of water and the unhealthiness of the climate have retarded their development.

RICHNESS OF MALAY PENINSULA.

The whole of the Malay Peninsula is thought to be rich in materials, and a great deal of it has been proved to be so.

KOH-SI-CHANG.

At the mouth of the River Menam is a bar which prevents vessels drawing more than 12ft. of water ascending higher; hence these have to find anchorage during the south-west monsoon at the island of Koh-si-chang, which, thanks to the efforts of the King of Siam, has been converted into a charming watering-place, and is to Bangkok as Southport is, I believe, to Manchester.

BANGKOK.

Bangkok stands on either side of the Menam river, some thirty miles from its mouth. So much has been lately written about the city that I feel it is unnecessary to describe its winding creeks, some embowered amid palms and ferns, others mere muddy cesspools, its floating houses, the busy life on the river, the gorgeous temples, the sickening cemetery with the bodies lying to be devoured by dogs and vultures, its tramways and electric lighting—in short, its curious mixture of pure Orientalism and European innovations.

The trade of Bangkok is chiefly in British hands, though the Germans have become competitors of late, whilst the Chinese almost monopolised the retail business. In 1890 British shipping was 67 per cent of the total shipping entering the port, *i.e.*, 316 out of 477; in 1891, a terribly bad year for trade, British vessels represented 84 per cent of the total, or 260 vessels out of 310. The chief articles of export are rice and teak. The two in 1890 accounted for £2,700,000 out of a total export trade of the value of £3,200,000. The former is absorbed to the extent of some 75 to 90 per cent by our colonies of Singapore and Hong Kong; and the latter comes almost entirely to Great Britain. Pepper, dried fish, and bullocks are the next largest items. Of imports, the total value being £2,631,000 treasure and gold, lead accounted for £995,000; cotton, £403,000, or one-sixth of the import trade, the entire bulk being nearly of British manufacture; and china goods, £165,000; jewellery, £131,000; and opium, £118,000. Many failures in trade took

place in 1890 and 1891, but this arose mainly from the unsoundness of the business system, by which European firms were ready to give unlimited credit to Chinese retail traders without proper security.

STEAMER TO PAK-NAM-PHO.

I left Bangkok on November 11, 1890, on the stern-wheel steamer which plies as far as Raheng when the water is very high, but on this occasion Pak-nam-pho was the limit of its journey; and, on its return to Bangkok, it was to be laid up till the next wet season. The cost of fuel swallows up a great part of its profits; the wood for the purpose has to be brought at a figure continually rising, and a barge load has to be towed down from Pak-nam-pho for the upward journey. Very little cargo can be carried, and the revenue is chiefly derived from towing up empty paddy boats. There is great confusion, and wild shrieks and cries rise when, as often happens, the steamer grounds on a sandbank, and the rice boats in four lines astern, with four or five boats in each line, grind and crash up against one another. Not far from the main river, about forty miles north of Bangkok, are the remains of the old capital, called Ayuthia. The jungle is now omnipotent, but here and there some of the old brick temples still stand erect. Bang-pain was the summer residence of the kings of that day, and the present king has restored the palace and made it a residence of veritable Oriental splendour. The river banks as far as Pak-nam-pho are flat, and form the principal part of the rice-growing district of Lower Siam. There are many villages peeping out amid the bamboos that overhang the river. We took four days to reach Pak-nam-pho. I here changed into a boat provided for me by the Chinese agent of the Borneo Company, and at the same time relieved him of a large sum of money required by the Chieng-mai Agency, and this to his great delight, as he was fearful of being robbed.

ROBBERY.

With regard to robbery, a good deal takes place amongst the natives, but it is very rare that violence is offered to an European. The governor of each province is the sole responsible authority; there are no regular police outside of Bangkok, and the soldiers can hardly be relied on as guardians of the peace. There is really very little to rob; the money of a Siamese soon goes in the gambling-house, and he cheerfully exists on the rice that is easily grown.

EASY-GOING CHARACTER OF THE NATIVES.

As an instance of the happy-go-lucky nature of the inhabitants, I was more than once delayed by the crew of my boat

insisting on stopping to hire others to come and do their work, whilst they would look on contentedly or else go ashore, where they might at any moment be liable to be called on to do compulsory service. When a prince or official is on his travels every district through which he passes is called on to supply him with food and transport; and if notice is given of his approach, or if it is rumoured that men will be required for military purposes, the male population in all probability discreetly retire into the jungle. These contradictory traits in their character were a puzzle to me, and were only to be explained by their indifference and dislike to look beyond the present.

MENAM BOATS.

The boats are some forty or fifty feet long, with a beam of about six feet. A long bamboo house is built amidships to a height of four or five feet above the gunwale, a high projecting stern is then added, through which an enormous oar, used as a rudder, protrudes. At the stern a second house, higher than the first, is constructed with bamboo shutters, that can be opened in fine weather. Here the steersman perches his three-legged stool, whence he can keep a look-out over the roof of the main house. Here also I lived, gazed at the scenery, and watched the face and movements of the steersman.

THE LAOS CREW.

The boatmen are invariably Laos, a more energetic and industrious people than the Siamese. There is usually a double crew of four men each, who work the boat for about half an hour at a time by punting with a long bamboo pole pressed into the hollow of the shoulder, with their bodies almost bent double. They have no hair on the face, unless it be a moustache resembling a scraggy tooth-brush; and their heads are shaven, except on the crown, where the hair stands on end as if astonished at the extraordinary face below.

COSTUME.

The men are as much at home in the water as in the boat, and their dress is well adapted for bathing exercise, as it never consists of more than a cloth around the loins, and this is often dispensed with.

TATTOOING.

Their bodies are beautifully tattooed, though it requires nearly a lifetime to complete the designs. This custom is spreading. Originally it was practised by the Laos on the west of the Mekong, who were accordingly called "black-bellies." Now it is being adopted by the Laos of Luang Prabang, who have hitherto been known as the "white-bellies."

STEERSMAN.

The steersman, when not engaged in shouting and stamping his feet to encourage the crew to greater exertions, would examine his face admiringly in a cheap German looking-glass, pull out a hair from his face, or stick a flower into his ear.

BORING OF EARS.

Like other races in the East, the lobe of the ear is pierced by an enormous hole, through which a large gold or brass ornament is passed; or else, if the hole is not too large, it forms a convenient method of carrying a cigar or other article.

RIVER SHALLOWS.

The river between Pak-nam-pho and Raheng was very shallow and intersected by many sand-banks.

TEAK RAFTS.

The teak rafts we met floating down the river were skillfully manœuvred past these in the following way: One man was stationed on a high scaffolding on the raft, and as soon as he saw they were approaching a shallow shouted to the crew engaged in poling. One of the latter would then swim out with a long pole attached to the raft by a rope, and planting the pole in some suitable spot in the river bed, the rope would tighten, and the raft swing round on this pivot into deeper water.

MENAM RAPIDS.

Above Raheng the valley contracts and the rapids begin. These entail much labour, and the boat requires to be towed, at which all hands assist. Wherever feasible a small channel alongside the main stream is roughly dug out of the river bed to enable the boat to avoid the rough water of the rapid. The scenery was very fine, magnificent rocks towering thousands of feet high, crowned on the tops by trees and bamboos.

FISHING WEIRS.

Throughout the course of the river is an oft-repeated obstruction. It requires a great amount of labour to force the boat through the bamboo weirs, made by the natives for fishing purposes, which they leave in the river after the season is over.

LEAVE RAPIDS.

It took me five days to pass the rapids, and then the valley opened out and villages on the banks were again frequent.

WATER-WHEELS.

There is an ingenious system of irrigation practised about here effected by water-wheels, the paddles of which are bamboos, cut in half and fixed at such an angle, that they retain some of the water till, by the revolution of the wheel, they are brought to the top and the contents are emptied into a trough, which carries the water wherever required. These wheels are, of course, of great diameter, and as they turn make a soft, low, murmuring hum.

CHIENG-MAI.

In twenty-four days after leaving Bangkok I reached Chieng-mai, the capital of the Laos country. This was less than the ordinary time occupied in the journey, the total distance of which is some five hundred miles. The chief was formerly only feudatory to Siam, but the latter has of late strengthened its authority over the country. The town, situated on either side of the Meping river, is divided into an inner and outer town, each at one time surrounded by fortifications. The inner town is where the chief and the princes lived, every house having its own extensive compound or gardens.

MARKET.

The market, owing to its picturesque crowd, was a most interesting sight. The women do all the selling, in a quiet, business-like way. Pork, vegetables, such as the sweet potato, onions and chillies, rice, coarse sugar, cocoanuts, plantains, tobacco, betel-nuts, cotton goods, silks from Luang Prabang, dried fish, and eggs, were the chief articles for sale. Behind the women was a line of shops belonging to the Chinese who import cheap European goods from Bangkok.

MANUFACTURES.

Throughout my travels articles of native manufacture were rarely found; their wants are so easily satisfied. Out in the country, the houses built only of bamboo cannot be described as permanent residences, and villages appear and disappear with extraordinary rapidity; consequently, the natives don't hamper themselves with many personal effects. The ever-present bamboo affords material for most articles of domestic use, with very little trouble in manipulation. Cotton stuffs are woven, having coloured borders for the women's petticoats, and by the number and colour of the stripes the tribe to which the wearer belongs can be ascertained. The cotton goods worn by the men are often now imported, and of English make. They also work a little in silver and gold, making baskets for flowers and boxes for tobacco and the betel-nut—which they

chew—and bamboo boxes neatly covered with lacquer. The peculiarity of this lacquer is, that it will only dry in the wet season. Native swords, or dahs, and various kinds of instruments of music almost complete the list of their industrial products.

MANNER OF WEARING HAIR.

The women, unlike the Siamese, wear the hair long. The men shave all except the crown. Further north the Shans, both men and women, wear the hair long; hence the various transitions become confusing.

DINNER WITH THE CHIEF.

The chief entertained me at a great dinner, and had a play in honour performed by the ladies of the harem to the accompaniment of native music. The latter is thoroughly weird, melodious, and silvery toned.

ARCHER'S MISSION.

Having completed my preparations, I started with Mr. Archer, our consul, who was to take charge of a mission coming from Burma to delimitate and survey the frontier between the northern Siduese States and our newly-acquired possessions of the Shan States tributary to Burma.

LAND ROUND CHIENG-MAI.

All round Chieng-mai the country is flat and well fitted for agriculture. A great deal of paddy or rice is grown, but a great deal of land now covered with jungle might be cleared, and, if properly irrigated, a handsome profit would be made. Even now, I was informed, a return of 30 per cent as interest might reasonably be expected. The whole country is very sparsely populated, and the rudest implements and most backward methods are employed in working the land.

IMPROVED STATE OF SHAN STATES.

In the Shan States there is already a marked development of prosperity, owing to the cessation of the tribal wars so constant before British authority became known; and this has been accomplished by the mere prestige attaching to our name, as the mission I accompanied was only the second expedition that had travelled for a few weeks through the country.

JOURNEY ON LEAVING CHIENG-MAI PLAIN.

But to continue our journey through the Chieng-mai district. On once leaving the plain, the path became a mere jungle track, and our route took us along the head waters of the Mekong, whose banks were clothed with tangled vegetation.

TROPICAL FOREST.

The hills became higher, but to their very tops trees grew in profusion. I need not describe the wonderful growth of a tropical forest—the tall palms, the festoons of creepers, and the trees covered with orchids. Unluckily the majority of these only bloom in the wet season.

ROUGH PATH OVER DIVIDE.

We had a rough scramble up a rocky track that took us over the divide between the Meping and Salween water-systems.

VIANG NGOI.

Before crossing the watershed, we passed the site of the old town of Viang Ngoi, now only the remains of a bank and ditch to be seen.

WITCHES' VILLAGES.

There are two villages some little distance off where people having evil spirits and witches are condemned to live.

PEOPLE SUPERSTITIOUS.

The people are all intensely superstitious. The houses are built in an orthodox fashion for keeping off the evil and encouraging the good spirits. Every paddy rick has its charm to ward off the spirits, and the approaches to a camp have always plaited devices of bamboo as a protection. The natives if travelling never go alone, and if it were required to send a messenger, no matter how short a journey, a companion had to be also hired; the Wa tribe, a head-hunting tribe, consider the head of a stranger as essential for protecting their village from ghosts, and it is said they have particular faith in the virtue for this purpose of the head of a white man.

CART TRACK.

After crossing the frontier we saw in the jungle the vestiges of an old cart track leading from Mung Hung to M. Ngoi. This was the more noticeable as, except for a few cumbersome carts with solid wheels about Chieng-mai and again near Chieng-sei, I never saw any in the Laos or Shan country.

TRANSPORT.

Trade is entirely carried on either by bullock caravans owned by the Shans, by mule caravans owned by the Hö traders that come from Burma, and who are Chinese driven out from Yunnan as rebels a few years ago, or by caravans of the human.

species. Elephants belong only to the chiefs, as insignia of their importance, or to the Burmese foresters for working the teak trees out of the forests.

TEAK.

We passed through one teak forest, but the wood in the accessible places and near to the water is getting rapidly worked out.

BRIDGES.

Our further march had the advantage now and again of being facilitated by bridges over the numerous streams. They were of rough construction, and, being very new, were a sign of the confidence felt by the chiefs in being tributaries of the Indian Empire. The motive, however, for building them is often that of making merit according to Buddhist ideas. Distance in those regions has most contradictory effects.

DISTANCE IN THE STATES.

Where we joined the party from Burma at Müang Tuen, they had been nearly two weeks coming from our easternmost military post, yet the chief of the district would have a fair knowledge of what was taking place in Burma and so throughout the country; on the other hand, there was sometimes the most extreme ignorance as to places not 50 miles off. How swiftly at times news travelled was a mystery. It is difficult to convey to people in this country how wretched are the means of locomotion. Sometimes it was impossible to follow the tracks through the jungle, so little are they used, and the dah of the natives had often to be used to clear a way through the rank vegetation; therefore, except for trading or warlike purposes, the inhabitants never move far from their homes.

RIVERS—DISCOLOURED WATER.

Rivers are plentiful throughout the country, but the water is generally discoloured with sand, except in the smaller streams, where the water is usually quite clear.

THE MISSION AT MÜANG TUEN.

We arrived at Müang Tuen in eight days, and there awaited the arrival of the party from Burma. On their joining us we formed a large company—six British, native servants, an escort of 40 Punjaubees, 200 oxen for commissariat purposes, and over 100 mules. Our forces were further recruited by the Siamese commissioner and his elephants, the Laos commissioner, and the

representative from our tributary Shan State of Kyangton. It was the frontier between this state and Siam that was to be delimited.

MUANG TUEN.

Muang Tuen itself is a small village in a pretty green plain, sheltered by the wooded hills around.

GAME—JUNGLE TOO THICK.

Game was abundant round about, but the natives take little interest in sport, and the thick tangled growth, bristling with the longest and sharpest of thorns, made it impossible to go far afield in search of deer or tigers. These abound everywhere, and the latter made frequent raids on the oxen, often throwing the whole camp into confusion.

CAVE OF THE MEH HANG.

Whilst at Muang Tuen I visited a narrow, precipitous gorge, down which the Meh Hang has cut its way, and then tunnels under a range of mountains into the Salween. The entrance of the tunnel was a vast cave about 400ft. broad and 140ft. high. Huge stalactites so closely took the form of statues of huge silent Buddhas that only a near approach could satisfy me they were not carved by human hands. Myriads of bats made a long stay anything but desirable.

ROAD TO M. SAT.

From M. Tuen to M. Sat the route we followed was in a northeasterly direction, and took us over the watershed between the Salween and the Mekong. The path was rather bad, and daily we ascended and descended several thousand feet, crossing narrow ridges and steep spurs. The highest elevation was not, however, more than 3,300ft.

ME-KHOK.

There were no villages before reaching the foot of the eastern slope of the watershed where the valley of Me-khok spreads out, a tributary of and flowing into the Mekong, a little below Chieng-sen.

M. SAT.

A considerable portion of the land was probably under cultivation in former times, when it must have supplied a larger population than the present one, which is comprised mainly of refugees from the districts on the Salween. The old town is situated close to the right bank of the Me-khok, and the area

enclosed by the moat shows it must have been a place of some pretension, but now there are only some 50 houses in it. The climate now became colder, the thermometer falling to 40° at nights, which made one shiver in the damp misty mornings, as the days were always hot, the thermometer rising to 88° or 90°.

MUSÖS.

A large party of the Musös, one of the numerous hill tribes, came to visit us, hearing of our treasure chests for the pay of the commissariat, &c., and styled us the "Lords of the gold and silver." They are an active, hardy race, very short in stature. They have their villages far in the mountains, and are very shy and reluctant to let strangers approach.

They carry bows and arrows. Of the latter some are poisoned for use against their human enemies, and they are very skilful in shooting, giving us a display of their powers. They had never seen so many people before and feared to camp near us, and did not like to sleep on the plain, as the hill tribes consider fevers attack them if they do so. They thought we were coming to make war, hearing the gongs beaten, which is the martial music of the Laos, though with us they were sounded merely to encourage the mules. They dress in blue, the women's garments being decked out with massive silver ornaments. When marching one of their number always plays on a curious instrument with pipes. We broke up the camp at M. Sat on the last day of the year 1890, and on January 1st we reached the village of Na Mon, which no white man had previously visited.

The antagonism of interests for the last decade has made the neighbourhood by no means safe. The outpost villages on either side were inhabited by men whom a sense of constant danger had made somewhat callous to the right of property. There was consequently nothing but an ill-defined foot-track, and even this had been unused for a year after the burning of Muang-Yon and Wyang Ke villages by the Siamese last year. We had, therefore, to cut, and in a good many places to dig, our own road, for not far short of a hundred miles in all, extending on either side of Wyang Ke. This resulted in a very serious loss of time, but as a compensation it induced the former inhabitants of the destroyed villages to return and rebuild their old houses, so that the line is now likely to be kept open. From a distance of about twelve miles below the town of Maingthat, as far as Ta Ton, the Me-khok runs in a narrow channel between hills, and the stream is rendered quite unnavigable by constant rapids.

Phya Pap, the celebrated rebel against Chieng-mai, was the immediate cause of the destruction of the Viang-Ke group of villages. After the failure of his projected rising at Chieng-mai he proceeded to Kyangton, where, attracting to himself some

of the floating bad characters who are scattered about the Shan State, he marched south and occupied Muang Fang. The chief of Muang Fang was himself engaged on a questionable enterprise against a state whose destiny, whether to be under our protection or that of Siam, had not been decided ; but he quickly returned to his capital, and, driving out Phya Pap, pursued him across the Meh Kók, and, on the ground that the Shan villages on the north bank had given assistance to the rebels, burnt them—hence the general devastation. The mission was running short of supplies, so I, with a large detachment of mules, went off to Muang Fang to try to get provisions. The chief was, in consequence of his former conduct, greatly afraid of us, and tried to keep away ; but I routed him out, and got him to give orders that rice, chickens, &c., might be sold, for, without his permission, the people did not venture to trade with us. The plain of Muang Fang is a rich possession, and of great extent.

On my return to Viang-Ke we were further detained by the non-arrival of Mr. Kennedy, who had met with some difficulties with the hill tribes whilst foraging. At length, to the relief of our anxiety, he returned, and we travelled in a north-easterly direction to Ban Meh Chan.

From Meungngam the road leads gradually up to a double ridge, the highest of which is 2,750ft. above the sea level. The ascent and descent are very gradual, and the roads, under ordinary circumstances and with regular traffic, would be very easy. It had, however, been almost totally disused for many months, with the result that we marched mostly among stream beds, and by paths cleared for us by working parties, through interminable stretches of giant bamboo. At length we entered the western fringe of the great Chieng-sen plain, but, although there were abundant signs of former cultivation, no inhabitants were met with until we reached the Laos villages round about Ban Meh Chan. Just under the hills at Pung Pen there is an extensive area of hot springs. There is a considerable deposit of sulphur, and the air was heavy with the smell of sulphuretted hydrogen. The water bubbled out from fissures of a reef of rock, and in at least one place spurted out in a spray to a distance of two feet. We had no apparatus for testing the temperature, but it seemed to be very close on boiling point ; and, in the early morning, heavy masses of steam rose from the marsh formed below the springs. A still more singular circumstance was the existence of similar springs of hot water in the bed of the Me Chan, which flows a short distance to the south. The stream is quite deep enough to suggest a bath, and the springs in its bed are quite hot enough to the bare feet to cause the bather to jump.

Our route lay under the abrupt precipitous ridges which mark the western boundary of Chieng-sen. Kyangton villages have crept down under this range, and are stationed on the

upper waters of nearly all the rivers here, as far down as the Me Sai. Close to the sources of the Me Tham, which flows out of a cavern at the foot of the sheer cliff, are two fine caves high up in the face of the precipice. Inside both are shrines, pagodas, and images, which seem now-a-days to attract few worshippers. This country is a long plain, which, from Ban Meh Chan to Hong-luk, was a three days' march—in fact, forming part of the fertile plain of Chieng-sen, though here as everywhere else there was plenty of land with no cultivators to work it.

A good deal of fever now prevailed among the party, but fortunately no serious cases. Whilst wandering in the jungle after our day's march I found some half cylinders of mud, which my guide informed me must at one time have been used as lime-kilns.

LEAVING HONG-LUK.

At Hong-luk the Commissioners were going to have a long palaver in respect of the frontiers. We had been in the Shan country from Muang Tuen to Ban Meh Chan, then Laos, and once again in the Shan country at Hong-luk. I wanted to pass on my journey and find a way over into Tonquin, as no European had ever been across.

DIFFICULT TO OBTAIN INFORMATION—INTERPRETERS' INACCURATE PRONUNCIATION.

This would take me into a region from which the chief of Chiengmai informed me I should never return; and now I experienced the greatest difficulty in obtaining information of any place more than a day or two's march distant, or if any information were supplied it would be contradicted by another speaker, and even sometimes on searching investigation a man would flatly contradict himself. Again, the many dialects, the difficult pronunciation, and many places of the same name caused great confusion, and the way of obtaining the most sure intelligence was by drawing maps in the ground and counting the day's marches.

IMPRACTICABLE ROADS.

During my journey I was often told that a road was impracticable, or it would take weeks to accomplish, but, as in other parts of the world, I always found a journey could be accomplished, and often at much quicker rate than stated, if a determined attempt was made.

MY PARTY.

With great regret I said good-bye to my friends of the Mission, and started off with my small party. I had ten mules

belonging to the four Hös, who would only be persuaded to enter into the unknown territory east of the Mekong by a 50 per cent increase of pay, a Chinese interpreter and a second interpreter Lao, and a sais or boy to look after my ponies. The Hös were fine, tall, strong men, and of a warlike disposition; but it was quite exceptional their consenting to come with so small a party—25 mules forms the ordinary minimum of any caravan.

OUR FIRST MARCH.

Our first day's march offered no serious difficulty. Unfortunately it was prolonged to too late an hour in the hopes of finding good camping ground, and it was dark before we arrived at a suitable spot, and the mule men came in furious. The result was that the next day we went only three miles or so, part of which time was occupied in crossing the Nam Lem and finding canoes to take over the baggage.

M. LEM.

The village appeared very flourishing and of some size. A man was engaged in smelting silver in the middle of the street by the aid of the most primitive bellows. The silver was to be used to adorn the temples, of which there were some fine specimens, and it was a highly remunerative plan to carry bullion in this form.

Gold leaf can always be sold at a high premium for the like purpose. So long ago as 1867 English cottons had found their way to this place.

We were occupied at M. Lem in endeavouring to get a mule to replace one of mine that was dead lame, and I also warned the head man against allowing my man to get any spirits to drink. Nevertheless, on leaving M. Lem, everything seemed to go wrong. One of the interpreters got drunk. Whilst engaged in getting him along the mule men took the opportunity of unloading the mules and enjoying a rest and food. The drunken man eventually escaped us in the jungle, and I never heard more of him.

ROUTINE OF MARCH.

Our usual routine was to rise an hour before dawn (it was my invariable lot to wake the others), start in about an hour and a half (having had a cup of tea and an egg) march for two to three hours, then halt for breakfast or lunch (consisting for me of rice and cold chicken), then on again till an hour or two before sunset, to wherever water for a bathe and grass or bamboo for the beasts to eat could be found. My food always consisted

of eggs and chickens, of which I used to try to keep up an eight days' supply. The chickens were tied to the mules, and the guides carried the eggs.

LEAVING M. LEM.

From M. Lem we went over paddy fields and then by a muddy path through the jungle, in which the leeches were so abundant that my boys with bare legs and the ponies alike suffered.

PALAO.

At Palao the country assumed a more cheery aspect. A succession of green park-like glades had quite a home-like effect, but to the anxiety of my men we here first heard rumours of dacoits.

KAW.

We met some of the Kaw tribes, like the Musös, living on the hills. They were of a very low height, the women having a remarkable dress like a kilt. On their heads, which were scarcely visible, they had semi-circles of straw covered with blue cotton stuff, smothered with gold and silver ornaments, forming a long veil reaching to the neck; on the top of this was a wooden yoke to assist in carrying the loads on their backs, ear-rings of glass or silver, and their neck and chest decorated in similar fashion, whilst bracelets loaded their arms. They had short blue vests and plaited petticoats with a sporran, bare knees, and blue gaiters clothed their sturdy calves. They were of extreme timidity, and rushed off into the jungle on our approach.

SELF-POSSESSION OF THE PEOPLE.

The people of the plains usually showed no fear, and if I camped near a village, which I usually tried to avoid doing, they crowded round and were interested and amused at my possessions, more particularly at those connected with the eating department.

SLEEPING IN TEMPLES.

I once or twice slept in one of the temples, the usual resting-place of the traveller, but the noise made by the worshippers, increased to impress the stranger with their earnestness, and the shrill prayers of the youngsters made it anything but a place of repose.

The forest ends at the border of the immense rice fields extending to the Mekong, which now I hit off at a place called Chieng-lap. The river bed is about a quarter of a mile wide, but being the dry season the water flowed in a rocky channel from 100 to 200 yards wide. We crossed on rafts, after propitiatory

sacrifices had been made to the spirits. Our further route lay down the Mekong. There were many marks of tigers imprinted on the sands, and on the opposite side peacocks were strutting about in the sun.

UP THE NAM MA TO MUANG LONG.

When we reached the Nam Ma, a tributary of the Mekong, we left the latter river and struck into a path leading up the valley of the Nam Ma in a north-east direction. On a high bank at the junction of the rivers is the city of Viang Kok. The camp and moat could be traced, though choked with jungle, and the place from its size and commanding position must have been of importance. The country from here to Muang Long was deserted, though the land is well adapted for agriculture. Muang Long lies in a strath on the banks of the Nam Ma. It is the beginning of the long plain which extends as far as Muang Sing, and past it, on to Muang Phong, in Chieng Hung territory. It varies in width from a mile or two at Muang Long and Muang Kang, to five or six at Muang Sing, and eight to ten at Muang Phong. Each of these townships is separated from its neighbours by gently sloping ridges, from 100ft. to 200ft. high, and covered with dense forests.

To the west a high range, growing steadily higher northwards, separates the strip of plain land from the Mekong, and to the east hills tower up to heights of 6,000ft. or 7,000ft., shutting off the Siamese territory so completely that there is absolutely no regular communication except, perhaps, by toilsome tracks from one village to the other.

The gradual re-settlement of the Trans-Mekong country drew the chief town eastward to the ancient town of Kyang Kheng, on the left bank of the river, and from there the present chief on his accession moved further eastwards to Muang Sing, no doubt as a precautionary measure against possible attacks from Kyangton. Chieng Kheng is by rights tributary to Kyangton, but the Sawbwa of the former was offended that his nephew should have been made chief of the latter state, and at our recognition of his nephew's claims. In his anger he had placed himself under the protection of the Siamese State of Nan. As Kyangton was one of our protected Shan States, I could not be sure what reception the Sawbwa of Chieng Kheng might give me. No European had ever visited the place. I therefore advanced with caution, and sent on my two interpreters for camping ground. Everything passed off satisfactorily, and I paid a visit to the chief, a kind, portly old gentleman, and most anxious now to return to his proper allegiance.

Except rice, coffee, opium, and a small amount of tea, which becomes more cultivated as one goes north, till the tea gardens of

Ibang are reached, there is no produce of any value in the state, sugar-cane and tobacco being only grown for personal consumption. This, however, is only because the land has not its resources developed, and requires better means of communication. Otherwise it is decidedly fertile, and, I should say, has a larger population than exists in adjoining regions. In my opinion, it is highly important that our Government should not shrink from accepting the allegiance of this state. The responsibility is insignificant compared with what they incurred when they took over Kyangton, the capital of which, under favourable circumstances, is a month's march from their nearest military post. At present, the frontier rests on the Mekong; and a river is always an undesirable frontier, more especially in this case, when, by crossing over, an excellent natural boundary is obtained, formed by a mountain range, with no path fit for even pack animals from between Muang Sai, in the south, till north of the parallel of the Chieng Hung. This would form an excellent line of demarcation between us and the French, and no one with any knowledge of that country would deny that the day must come when we and the French will have continuous frontiers, for they will advance till they meet us. Moreover, we should, from our position, be giving moral support to that portion of Nan lying on the east bank of the Mekong, and we should ourselves be holding a commanding position in the fertile districts of the upper part of that river. The Government, by accepting what is offered them, would acquire what I consider to be of the utmost value to our interests.

I left Muang Phong, one of the towns of the Sibong Pana, held to be the richest and most fertile region in northern Indo-China, thence on to Muang La, where, finding a due easterly course to the Black River was impossible, I had unwillingly to go south-easterly to Muang Sai. The difficulty of obtaining information was very wearying. Descriptions of the route were never reliable for more than two days' journey ahead at the most, and drawing maps on the ground was the only method of getting an idea of the relative distances between places.

The hill tribes, of whom there are many varieties, are timorous. They live hardy lives, wandering about as the soil on the hill sides becomes exhausted by the crops of paddy.

CURRENCY.

Our rupees and two-anna bits were in great request, but the common currency are pieces of silver, usually in the shape of a half globe, and of the diameter of a rupee. Out of this bits of the value of the article to be purchased are struck with a chisel on stones placed for this purpose in a basket in the middle of the market. The Chinese silver bar is also used, and sometimes ornaments, such as bracelets, which all the women wear, even

amongst the poorest, are cut up in the same manner. Gold ornaments are not seen until Luang Prabang is reached, where the well-to-do classes consider it undignified to wear silver ornaments like the hill people.

SALT WELLS.

The next halt was at Bô Hë, or Chienghë, a small village in the picturesque little valley of the Nam Hë, a tributary of the Nam Ngo. Here we found the first of the salt wells of this region. The people are in great fear of the spirit which is said to preside over the well, and at first raised some objections to our entering the precincts of the works, they themselves never approaching them in white or red garments, as this is said to offend the spirits. We overcame their scruples, but found the well not yet in working order. It is quite close to the stream, and the salt water seems to be favourable to the growth of fish, for their number within the dams of the Nam Ngo was most extraordinary.

Another day's march brought us to Bô Luang, or the great well, similar to that of Bô Hë, and this was in working order. The water, which is cold, clear, and very salt, is found some 10ft. below the surface. A large crane with buckets helps to draw it up, and it is poured into a number of troughs, which distribute it in turns to the sheds built all round. It then runs into a shallow reservoir, some 5ft. broad and 4ft. long, dug into the ground. It is taken out with a long bamboo spoon, and boiled in three flat pans 2ft. in diameter, set on a large round oven built within the shed. When thick, it is poured first into a trough and then into a mould about the size of an ordinary brick, with bamboo network on one side which allows the water to run out thoroughly. A flat board is used to take the new salt brick out of the mould, and it is then piled up with others in a corner. The sheds are by no means clean, and no precautions are taken against dirt. Two annas is the price of each brick, the dimensions of which are 9in. by 5in. by 2in., and the cost of transport may be judged from the fact that the price at Müang Sing, seven marches distant, is just double.

TRADE.

This salt trade makes a considerable traffic by bullocks and carriers on the route from Chienglap to Bô Luang, but this is doubtless only during a few of the dry months, for the wells are flooded in the rains, and therefore not worked.

CHINESE CARAVANS.

Besides bullocks and carriers we also met a number of large Chinese caravans. The muleteers are generally Mahommedan

Yünnanese, or, Hös, but some are Chinese from the borders of Szechuen and Kweichau. The local people distinguish them from the Mahommedans as "Ho Luang," or men of Greater China, and pork eaters. The leader of their long train of mules is much more ornamented than I have seen westward, having its head gaily decked with silver trappings, foxes' tails, peacocks' feathers, and even gaudy labels of foreign goods. Most of the caravans we met near the salt mines, and later towards Muang Sai, ply between Vipang, as well as other northern districts of Chienghung, and the territories of Luang Prabang and Muang Nan. They bring down opium, which they sell or exchange for raw cotton. The trade consists almost entirely of these two articles, the opium being disposed of and the cotton collected on the way amongst the hill people. The greater part of the trade of these regions is, therefore, comparatively local, and foreign goods have very little share in it; nor are any imported goods likely to compete with the local demand for raw cotton in the north and opium in the south.

On leaving Bô Luang we crossed the watershed between the Nam La and Nam Tha. There is here a low range of undulating hills, and the pass is only about 3,000ft. above the level of the sea, or a few hundred feet above the valleys at Bô Luang and Bô Ten. The district of Bô Ten or Muang Lik is the last one in the Chienghung territory, and comprises the head waters of the Nam Trung. The distance from here to Chiengkong is twelve marches, through Muang Pukha, and over very rough and mountainous country.

HILL TRIBES.

Here the hill tribes are mostly Yao Yin and Lan Ten. The former have the neatest and most intelligent appearance of all the hill people, and bear a closer resemblance than any other to the Yünnanese, whose language they mostly understand. The women have a light complexion, and wear a very becoming costume—a loose kind of Turkish trousers of very finely embroidered silk, a long loose coat, and numerous silver ornaments. On ceremonial occasions they wear an extraordinary head-dress of red cloth, stretched over a stand about 6in. off the head and about 2ft. long and 1ft. broad. The men's dress is the same—loose dark-blue trousers as the Lan Ten tribe. The latter wear a pigtail, eat with chopsticks, and have generally a strong resemblance to the Chinese. Their women's dress and appearance is also very like the Chinese—loose trousers and long skirt of dark blue or almost black colour, with the hair parted in the middle and fastened with silver pins. They seem, in many respects, distinct from the other tribes, and, though their language is more akin to that of the Yao Yin, they understand it with difficulty.

HILL VILLAGES.

Their villages, like those of all other hill people, are generally on the side of a hill, but they do not inhabit the ridges as some other tribes. Their houses are long sheds, with straight walls, built entirely of split bamboo. The interior is one long room on the level of the ground, with partitions for bedrooms; and a striking and most uncommon piece of furniture is low stools to sit on. The roof is also of split bamboo, and it is difficult to understand how they can keep dry at all in the heavy rains. I found these people, like all others, most hospitable and good-natured, showing neither fear nor the least disrespect, though they had never seen a white man before.

The value of currency is not understood among these hill people, and, as they will take no coin less than a rupee, there is great difficulty in making purchases. A rice-pounding mill I saw in one of these Lan Ten villages struck me as most ingenious. The water is diverted from a stream through pipes into a trough cut into one end of a long ordinary rice-pounding pestle. When the trough fills, the weight raises the pestle, which, when the water is discharged, falls back into the mortar and pounds the unhusked paddy in it. This contrivance is so simple, and saves so much labour, that it is surprising it should never have come into use in other districts in the north of Siam, where the pounder is usually worked with the foot.

The Meos are also fairly common about here, and are distinguished by their white clothing of thick cotton stuff. The women wear a kilt reaching to the knee, with the cotton gaiters common to nearly all the hill tribes, a jacket opening at the neck, and a head-dress like that of the Ko, but higher. The road to Muang Sai ascended the valley of Nam Se, past the village of Bô-chün (near which are some lead mines worked by Khamus), and crossed the main watershed of the Nam Tha and Nam U, at an altitude of 3,300ft.

MUANG SAI.

Muang Sai was the first considerable Siamese place we came to, and we found here a small Siamese post and a Lao governor from Luang Prabang. It is a large village of several hundred inhabitants, situated in the valley of the Nam Ko, a small tributary of the Nam Phak. As a trade centre it is disappointing, for it has no market or trade worth speaking of. The whole district of Muang Sai comprises, in the valley, only nine villages, but, of course, there are many more Khamu villages on the surrounding hills.

Opium is imported by the Hö caravans, salt comes from fields in the district, and iron from a mine near the sources of

the Nam Ko, worked, like the lead mines, by Khamus, who pay revenues to Luang Prabang.

MUANG LA.

Our own route lay north-eastward through Muang La, a small district of only three villages. It is a picturesque place in the narrow valley of the Nam Phak, a large stream that comes from the north through Muang Ai and Muang Ngon.

The great attraction here are the salt fields, which are quite close to the river and almost level with it. Here are no longer wells, though there can be little doubt that if wells were dug far larger quantities of salt could be obtained than at present. The people will not do so, as the common belief is that it would disturb the local spirit. Moreover, it is believed that a salt well in these regions would drain those of Bô Hè and Bô Luang, and the workers have consequently begged that no wells be sunk on this side. The salt is obtained by scraping off the efflorescence on the soil. The fields, about five acres in area, are carefully prepared every year after the rains by levelling, removing the stones and gravel washed down by the river, and laying on fresh soil for the depth of a few feet. They are then divided into lots, the headmen and principal families of the district taking the double share. The hard soil, well beaten down, is covered with about an inch of loose earth; the salt rises to the surface, and every five days the loose earth is scraped up in the afternoon and fresh earth put on in the morning. Every day, therefore, after sunrise and before sunset, the level fields, with the different coloured lots, are covered with a busy crowd, raking and scraping with their long wooden instruments, presenting a very lively scene. The workers are nearly all women, the men attending more to the washing and boiling process in the sheds. The salt earth is thrown into a hollow mud receptacle, with some charcoal at the bottom. Water is thrown over the earth, and, passing through a tube, carries with it the salt. A small weight of stick lac is used to test the density of the salt water. The earth from which the salt has been extracted is used again to throw over the salt fields. The salt water is boiled in pieces of split bamboo about two feet long, placed side by side on a long narrow oven.

There was no path by the river practicable for mules, and I did not venture to let them leave me and go on by water, as I should require them later on. Consequently we had to take a path along the mountains on the left bank of the Nam Pak, and one which I could not learn had ever before been used by pack animals. It was by far the hardest travelling I had done. We took three days from Muang La to where we rejoined the Nam Pak. The greatest altitude we went up was 4,000ft. Some of the ascents were, I feared, impossible for laden animals; and

the narrowest of tracks on precipitous slopes, often blocked by fallen timber, made our progress slow, though I had eight natives cutting a way. One pony rolled over the edge, but, curious to relate, after two hours' hard work, was brought up again not much the worse. At another spot the path had broken away, and there was only a projecting boulder to enable one to scramble over the breach. It seemed impracticable; fortunately, however, whilst my retinue were declaring the impossibility of proceeding, the leading mule tried the place of its own accord, and, being successful in making the double jump, the rest had to follow.

We were on the paths of the nomadic hill tribes, who just clear the jungle here and there to grow paddy, and therefore this was almost the first opportunity I had of getting a distant view. A feeling of awe came over me when there was nothing to be seen but a crowd of jungled hills, and after passing one of those clearings the dense impenetrable shade of the forest seemed intense. The hill villages were miserable places, with nothing to offer or sell. But Ban Ma, situated in a valley, was inhabited by some of the Thai-Dam from Muang Theng, whom I have before described. They were very well-to-do. The three headmen came to do homage, prostrating themselves three times, and also made me offerings of rice and eggs. The women, hearing I wished for some of their homespun petticoats, brought a great variety to choose from. Floors of houses are not raised above the ground. Women wear a long black upper garment and dark-blue trousers, and hair parted with a transverse parting two or three inches away from the forehead. Men have black turbans, long black overcoats, and trousers.

I saw evidence of other European influence in the shape of a French ten-centime piece on the neck of a child. All through the country I had been passing, the only coinage that is current is Indian silver. From this village we went east, following the Nam Ma and Nam Noi. Then our difficulties began again—the valley contracts, and the ribs of rock project into the river. I was assured by the natives that one place was impracticable, and it was only after cutting the jungle for a quarter of a mile on the steep opposite bank that the party managed to get on. At length we again reached the Nam Pak, and camped on the right bank at Na Sien. I was told there was no further road for mules, but I determined on putting the loads on a raft, and allowing the animals to get along as best they could. My mulemen were in despair: for many days they had been imploring to be allowed to be off their bargain and to return, and they said now they were worn out and could not face further difficulties. I was inclined to let them off, as a boatman said he could take me all the way by water to Muang Theng. Fortunately for me I hardened my heart, and determined on keeping

to the mules, as there would not have been nearly enough water in the Nam Ngoa to have allowed the carrying out of this plan.

The next day saw three of the party in a canoe, the baggage and one of the interpreters on a raft, and the rest had to scramble with the mules along the banks. The boatmen handled the canoe very skilfully; and it was pleasant, after the hard travelling, to lie down, with the occasional excitement of getting splashed when shooting a rapid. The raft came to grief, and only arrived at the camp long after sunset, having accomplished the latter end of the journey by the light of my solitary bull's-eye lantern. We passed some young Poungees or priests in a canoe, decorated with little tricolour flags, having "Vive la France" on them. When I reached the Nam U, there was a large tricolour flying on a boat which had lately brought up two Frenchmen from Luang Prabang. They had gone to Muang Sai, so I missed them whilst coming along the hill road. I subsequently learnt they were Messrs. Macey and Massy, who were going into the Sipsong Pana with the view of opening up trade. The peculiarity of these boats, which are about 25ft. long by 3ft. beam, is that they are steered in difficult places with an oar fixed on the bows, and are lightened by bamboos fixed to the sides, which also act as fenders against the rocks. The scenery is pleasant, the hills are dotted with Khamu villages, but on the banks the Thai-Dam population is very sparse. The Nam U, one of the largest affluents of the Mekong, was some forty yards broad, some five feet deep, with a current of about two and a half miles an hour. The mules swam the river, and proceeded down the left bank, as the road to Muang Theng branches off at Sop Hat, some nine miles further down. Sop Hat is a Siamese guard-house. The distinguishing characteristics of the Nam U are the high, steep slopes of the valley, preventing cultivation, and giving a poverty-stricken appearance to the whole valley. The road on followed a range of hills, with water at only rare intervals, and I, not fully understanding this, started rather late, with the result that night came on and we had no water. The Hos refused to proceed in the dark, and in a spirit of general discomfort we had to go supperless to bed.

The next morning from a hill top a splendid panorama displayed itself; the mist in the valleys had the appearance of a ruffled billowy sea, but motionless, studded with islands fringed to the water's edge with lovely vegetation. Even my Chinese interpreter admired the beauty of the scene. Sop Nao is the easternmost Siamese post before reaching the first French station. It is a well-to-do village, and laid out with considerable neatness. On returning from a stroll after my frugal evening meal, I heard, to my astonishment, such words of command as "Shoulder arms," "Charge bayonets," &c. This turned out to be my Chinese interpreter, We Yan Hu, who had been a

volunteer in Burma, engaged in putting through his drill a Siamese sentry posted to protect my property. The drill in Siam is or was entirely carried out in English. The path as far as the French frontier was thickly overgrown, and necessitated a great deal of cutting—as what little trade exists is carried on by river.

At times the fallen timber could not be circumvented, and was so large that ramps had to be constructed, by which the mules could get over. The watershed forming the frontier has an elevation of 4,400ft., with a very steep descent, of which my interpreter took advantage by sliding down on a plantain leaf, though it brought him ultimate discomfiture. In trying to push on to Muang Theng I got benighted in the jungle, and was without food—except a little rice—or covering, as the mules had not been able to keep up. Most of the night was spent in putting fuel on the fires, as the fall in temperature always felt most bitter after the heat of the day.

The next morning we passed through a fine grassy plain previous to arriving at the Nam Ngoa. Some large deer darted away at our approach, and wild cattle were seen not far off. At length, after wallowing in deep muddy holes, we traversed the Muang Theng or Dien Bien Phu plain, which, though there had been but little rain, was partially under water.

By 9-30 a.m. on March 4th I heard the French bugle, and crossed the embankment surrounding the fort. Captain Leger, of the *Infanterie de la Marine*, came to greet me, and I was soon comfortably lodged in a bamboo house, also—what was more to the purpose—had a good meal. There are only a few native houses near to the fort, Muang Theng village being five miles away. The fort is situated in the middle of the plain, which is about 15 kilometres long from north to south, and about six or seven broad. The Nam Houm flows close outside the parapet, and has its banks smothered with sweet roses. In the rains the whole country is inundated, and even when I was there Captain Leger said I should only have to remain a few days to get fever. There were two European non-commissioned officers besides himself, the troops being *tirailleurs* or *Annamites*. Son La Chau is the present headquarters of the district, though they draw their stores from Lai Chau on the Black River, four or five days' march.

After spending two nights at Muang Theng, I left for Lai Chau, or Mung Lai as it is called by the Siamese. The travelling now was very different from what we had experienced; the whole way to Lai Chau the path, with the exception of a few rocky places, was kept in good repair; the rivers and streams had bamboo bridges of sufficient strength to bear laden animals.

At the village of Na Thang, two hours from the fort, the road to Son La branches off. Silkworms are bred here; but the village

struck me as miserably poor. Provisions were double the price we had paid in the Shan States, and neither plantains nor goor (coarse sugar) were obtainable. On leaving the plain, the altitude of which is 1,800ft., I crossed the watershed (2,700ft.) into the valley of the Nam Pun.

After the junction of the Nam Mun the road led up the valley of the latter stream, which is very charming with its deep rocky pools. But I had one most unexpected climb. The watershed leading over into the Nam Tay or Black River, instead of being 1,000ft., as I had been led to expect, above the valley, was nearer 3,000ft., giving one a hard climb in a mid-day tropical sun, and for five hours without water. I now learnt the benefit of the jungle, which I used to abuse for shutting out all views. The French say the natives have cleared it away, the latter that the sun sets fire to it. I could see no signs of any cultivation, and should imagine that the soil was unsuited for jungle growth. On the crest of the watershed are two depressions, which during the rains must form lakes, as there appeared to be no outlet. For two hours we skirted the valley high up on the mountain side, with magnificent scenery stretching away to the north-west. Half-way down we came to a spring of water, and a native brought in a bunch of grapes the size of small peas.

Our last camp was at Muang Tung, where three of our mules were killed by tigers during the night and close to the village. Fortunately the march to the Nam Tay was only some nine miles, and very easy travelling down a narrow valley studded with villages. The post is on the north bank of the Black River, and a boat shoved off to take me over. On landing on the rocky promontory, Captain Seignier and M. Pellitier came down to welcome me. As we climbed up the steep path I was shown a flood-mark 66ft. above the normal river level. It was almost incredible. The size of a town in Indo-China must not be gauged by the size of the lettering in which it is printed. At Lai Chau the hills rise abruptly from the valleys of the Rivière Noire and Nam Ma, leaving space for only two or three native houses, and the half company of tirailleurs take up most of the room. The Europeans were only five in number, but it is a deadly place for them, as the well-filled little cemetery only too sadly testified. The remains of former brick dwellings of the Chinese were to be seen, as also the wheel of a gun-carriage brought by the Siamese in one of their wars; which, considering the nature of the country to be traversed, must be regarded as a wonderful performance. The Black River might well be so named, for its valley is precipitous and gloomy, and the valleys that run into it, excepting the one I had descended, are steep and narrow, giving, in spite of the sun, a sombre and chilling effect. The gorge through which the river pursued its course was particularly precipitous, and was a mere cleft in the range

of mountains. A storm at night made not only the frail bamboo houses shake, but seemed as if it might sweep away the very mountains in its tempestuous rush down the defiles.

Provisions, at all times dear here, had increased in price owing to failure of the paddy crop, and a disease amid the chickens. To get rid of this last evil, the corpse of a defunct fowl, hoisted on a high bamboo, was waving about in the air.

Here I had to part with my men, except the Chinese interpreter, the services of the other one who had acted as intermediary interpreter being now of no use. They had behaved very faithfully. My mulemen, through fear of attack, took a draft on Chieng Mai for half of their pay, but it was long before I heard anything further of them.

After some delay in getting coolies for my boat, I left Lai Chau on March 11th, having the warmest recollections of the hospitality I received at the hands of the two French officers, and greatly did they envy me my departure. There is a great variety of hill tribes in these parts, some who tattoo their faces where their beards and moustaches should be, others whose women-folk raise their petticoats according to their wealth, and others who drink through their noses. These are customs I don't myself vouch for, and which may be classified as travellers' tales.

The first day, descending the Black River, there were many rapids to shoot, and it was exciting work to see how swiftly the natives turn the boat in the midst of the boiling water, which comes foaming and splashing over the sides. The first three hours the mountain sides were precipitous, then the hills became lower and more jagged with isolated, pointed rocks. On the right bank, near to Na Shan village, for about a quarter of a mile, is an unbroken face of rock, hundreds of feet high, with numerous caverns at the base worn away by the water.

The river above Van Bu is little broken by rapids, but flows deep and placid; in fact with so little current that the four boatmen were unable to make headway against a strong breeze blowing up the river. The boats are most uncomfortable, and quite unlike those on the Me Ping. They are some 45ft. long and 4½ft. beam; in the centre they have a circular bamboo and plantain leaf shelter, into which one crawls like a caddis-worm, and there sleeps and eats. When descending the rapids the water splashed over and burst through this frail covering, soaking me and my belongings. I preferred standing outside and watching the swift passage of the boat, through the roar of the waters, at one time apparently charging right on to a rock, and then the man with the stern oar would shout and stamp his feet, and the boat, beautifully guided, would whirl by the danger. However, the steersman said he could not see, and I had to retire to my cave.

At Van Bu a new French post was in course of construction,

and the three or four Europeans there complained terribly of the fever exhaled in disturbing the soil. The officer in charge was a piteous spectacle to see. He could barely move for weakness.

Ta Chan, a little down the river on the right bank, is the port or point of landing for Son La Chau. A sergeant commanded the post. He was one of the few Frenchmen I met who had a good word to say for the Black River, either in the way of health or productiveness. The minerals he especially mentioned as being in abundance, and showed me specimens of gold, lead, iron, and copper. But so far as I could see, till the delta is reached, the sides of the river are almost uninhabited, and fertility of soil was quite wanting, though I was informed that flax, maize, and cotton are grown on the hills. To me there appeared the greatest difference between this country and the Shan States, the advantage lying with the latter.

A large rapid below this place, and then the water was of slow current till we reached Takao, where the steamer in which M. Pavie attempted to ascend the Black River was finally wrecked.

Van Yen is an important French post on the left bank, and is the headquarters of a district. When I arrived there were few troops present, as a large column had just left in pursuit of pirates or dacoits. From Van Yen to Cho Bo is only one long day's journey in the dry season. The floods make the travelling just three times as quick. The journey up the river from Van Yen to Lai Chau in the dry season would take quite three weeks.

I arrived at Cho Bo just six weeks after the catastrophe when the Resident, M. de Rouvigny, was killed by dacoits, and the settlement entirely burnt. The other Europeans escaped into the jungle; but a French officer, and a Frenchman travelling under his escort, arriving at the post after the event, were both murdered whilst at dinner by the militia, who had received orders from the chief of the dacoits to do so. The militia then joined the dacoits, with a large amount of ammunition and rifles. When I arrived but little had been done to rebuild the place, and the marks of bloodshed were yet visible. At Cho Bo is a barrage of rocks, an obstacle to steamers going higher up the river, which otherwise they could easily do as far as Van Yen. I descended the river from Cho Bo for some distance in a gunboat, and then, owing to the shallows, I had to continue my journey in a sampan, or large boat, till nearly opposite some curious rocks on the right bank, called from their close resemblance to the church, *Les Rochers de Notre Dame*. There was a temporary military post at Tuvu on the opposite bank, where the greatest excitement reigned, owing to an expedition having just returned after a two days' fight and victory

with the dacoits, or "pirates," as the French call them. The whole country was in a state of ferment, troops being despatched in different directions, and burning villages and fire signals were visible all round.

I had an escort with me and was not allowed to part with them before reaching Hanoi. The country below Cho Bo gradually alters in character and becomes open, most fertile, and thickly populated, especially on nearing the junction of the Black and Red rivers. At Vie Tri, where the Black River is joined by the Clear River, the delta may be said to commence. Vie Tri is a purely military post, and I again found excitement, owing to the despatch on the morrow of a large force in search of a quite different band of dacoits. The journey down to Hanoi was slow and tedious, but there was a charm, though a sense of awkwardness, in approaching again a place boasting anything of Western civilisation. The "Rue Paul Bert" is quite European; the success of the place, though, is entirely dependent upon the large official population. Improvements are being carried out; the most interesting feature being perhaps the Horticultural Gardens, started for the purpose of introducing new plants for cultivation into Tonquin. The results have been hitherto most satisfactory; and apparently tobacco, cotton, and coffee can all be grown. At present paddy, opium, and castor oil are what the natives are content with producing. Here my travels across Indo-China were really ended.

A steamer runs every day to Haiphong, the port of Tonquin, which, though well laid out, is not as yet the seat of great commerce. The Messageries Maritimes call here weekly; and, after an interesting trip, calling at the different ports on the Annam coast, I was landed at the charming town of Saigon, having everywhere met with the greatest kindness from the French in their new possession.

It is an impossibility to exaggerate the fertility of the Tonquin delta and the density of the population on its soaking surface, as a contrast to the barren appearance of the interior, though even there it is not to be forgotten that there are forests to cut and the land is fit to produce cotton, maize, and other products, besides, probably, yielding great mineral wealth.

That completes the story of my wanderings, and now may I briefly sum up the present situation. The Siamese during the present century have had jurisdiction over the land lying between the Mekong to the mountain range that forms the natural boundary of Annam. All that region the French have taken, comprising a third of the whole kingdom of Siam, also the islands of the Mekong. It is to the west and north of Luang Prabang that we are to erect a buffer state between us and France. I mentioned to you the State of Kyang Kheng, a tributary state to Burma, which we gave to Siam when in an

amicable spirit we arranged our frontiers with that country, but with the express stipulation that it was not to be handed over to another power. It would seem under the circumstances to be grossly unfair that we should sacrifice as neutral territory manifestly our own for nothing in exchange. Again to the north is the State of Kyang Hung, which has paid tribute alternately to Burma and China, but has had nothing to do with Annam. I believe it had been allowed by the Government to recognise China's suzerainties over this state, but were France to step in it is evident that friction and annoyance would result, as the great hope of getting a railway from Burma into Yunnan or Siam would be frustrated. From the plain of Chieng-sen to Kyang Hung a railway could be constructed without difficulty, and the country only requires more inhabitants to become most productive. We may presume the buffer state will be constructed out of these states, but what are the French going to sacrifice if we are to surrender K. Kheng? What are to be the commercial and trading facilities? Finally, what are the guarantees of the inviolability of this new state? I ask that you keep an anxious watch on the negotiations.

Now to turn our attention further south. You are aware of the injunction laid on the Siamese of withdrawing all troops within 25 kilometres of the right bank of the Mekong.

Well, troops are the only guardians of order in that country, and it may be fairly assumed that France intends that her influence shall be paramount in that zone. Were it not so, and the restriction were made merely for the chance of avoiding a quarrel arising between the troops, she would have withdrawn her troops for an equal distance from the left bank of the Mekong.

That the prohibition entailed interference with this belt of land is now borne out by intelligence that I received the other day, that this prohibition necessarily involved stringent fixed regulations, as well as the direction of public works there. This is hardly compatible with that full native independence and integrity of which we have had such ample promises.

Now allow me to read out a short paragraph from the work of M. de Lanessan, the present Governor General:

"If we adopt the ancient limits of Tonquin, our frontier should start from Cape Packlung, pass to the north of Langson, Caobang, Tatke, and Laokay. On the south-east of Laokay the frontiers between Yunnan and the states tributary to Burma and Siam are very vague. We have every interest in leaving them such, so as to be able to push them back some day to the Mekong. On the west, from the frontier of Yunnan to the mouth of the Se-Moun, the Mekong should be our frontier. From the Se-Moun our empire should cross the Mekong, and include the provinces of Battambang and Angkor.

"The basin of the Se-Moun, which belongs to the basin of the Mekong, is separated from the basin of the Menam, which represents Siam, properly so-called, by a mountainous and desert region, which constitutes a natural and scientific frontier. That mountainous frontier should be considered by France as the natural limit of her Indo-Chinese empire on the side of Siam. Having retaken the Great Lake provinces, which formerly were dependent on Cambodia, the basins of the Mekong and the Se-Moun we ought to make a point of respecting and, if necessary, protecting the independence of Siam."

How completely this view is being carried out is further shown, that this boundary fixture gives the French the power to forbid the Siamese to make any fixed or other government changes on the Mekong river trade, while leaving the French freedom to make any trade arrangements they please without any regard to the rights or previous regulations of the Siamese. No wonder that the ultimatum was couched in vague terms, the limit given for consideration of them being but a few hours, when such a wide construction has been put on them.

Since writing the above, subsequent events prove their truth. First, in regard to the trade on the Mekong, the French have already endeavoured to obtain commercial jurisdiction over both banks. Lieutenant Simon, charged with the exploration of the Upper Mekong, reports on the necessity of diverting any trade on the river to Saigon, instead of its passing by Korat and Bangkok. And it has been proposed at the French Geographical Society that the whole valley of the Se-Moun should be reserved to French influence. Again, the absurdity of the French demanding a fresh trial in the case of the death of Captain Groscurier, when all the evidence obtained shows that he met his fate in ordinary jungle warfare, is a proof of their extreme reluctance to fulfil their share of the Convention by quitting Chantaboon. Here arises the danger that the Siamese, who have most scrupulously fulfilled their share of the treaty, may become irritated into taking some aggressive action, affording a pretext for French warships to enter once again the Menam. We may feel assured that should this occur the French flag would float permanently supreme over Bangkok. It is generally allowed that we who have done everything for the development of trade in Siam, and whose shipping is represented by 90 per cent of the whole, could not afford to be shut out of such a market by a nation whose favourite policy is to raise a tariff wall against all strangers.

Our one resource is to enter into a joint guarantee with France to preserve intact the freedom and integrity of the kingdom of Siam.

JOURNEY THROUGH THE SYRIAN DESERT TO MOSUL IN 1893.

BY DR. MAX BARON VON OFFENHEIM.

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I WISH to prefix to the following report of the journey which I made across the Syrian desert, and through Mesopotamia to Mosul and Bagdad, the statement that a detailed account of the same, with a map, will shortly appear in "Peterman's Mitteilungen."

As far as I can determine, the greater half of my expedition by land led me through country hitherto untraversed by any European traveller. The territory in Asiatic Turkey which I traversed was inhabited nearly universally by Arabic-speaking people. The Turks were represented as a rule by officials and soldiers. In the territory of the Tigris I met tribes of Kurds.

My preparations for the expedition consisted in several previous journeys, lasting in all about 18 months, in Arabic North Africa, and especially in an expedition a few years ago in the interior of Morocco, as well as in a residence of several months in Egypt, which I devoted to the thorough acquisition of the Arabic language, under the tuition of a native teacher and his friends in Cairo, keeping myself altogether free from intercourse with Europeans.

I organised my expedition in Damascus in the middle of June of last year. My caravan consisted of twelve camels, and half a dozen horses for us equestrians; in addition, for prudence sake, I took some dromedaries with me.

It was needful to pay special attention to the supply of water for the horses; at times we were obliged to take ten special camels with us to carry water and fodder. I would mention, in passing, that last summer in the Syrian desert was specially hot; my readings from the four thermometers which I had with me gave in the two hottest months of July and August an average maximum of 50° C. in the shade (122° Fahr.).

As companions I had with me a Sheikh of the Auesi-Bedawin, so that I might at any rate be protected against robberies of this powerful tribe; also a young Syrian, born in Hama, who was a medical student at Beyrout and knew Turkish, as well as five native servants and three native camel-drivers. I need not add that we all were well armed.

Thanks to the Embassy in Constantinople, I had letters of introduction to the *Walis* (governors) of the provinces I was to traverse. I cannot refrain from mentioning gratefully that I was always met in the friendliest manner, and received most practical assistance everywhere at the hands of the Turkish authorities. Of course, my introductions were of no use in districts inhabited by tribes who had thrown off the Suzerainship of the Sultan. With these I had to make successive friendly agreements.

The first place I determined to visit was the Hauran mountain range. In a short time it will be possible to reach to nearly 25 miles from the foot of these hills by rail from Damascus. The line is to be opened this year to Meserib, about 65 miles south of Damascus. It is being built by a Belgian company. The line which is planned

from Beyrout to Damascus was only begun last year. All the material for the Hauran line had to be carried along the carriage road, which belongs to a French company, from the coast to Damascus.

The Hauran is a high volcanic range of hills, in parts very fruitful, on the east of the Jordan valley, south-west of Damascus, with a multitude of well-preserved ruins mostly of the Rhassanid period, which are connected with each other by thoroughly bad roads running up and down hill. The territory is inhabited by Druses, a strong, sturdy, patriarchal mountain race, living under the rule of separate families, and maintaining a mystic secret religious faith. They have a bad reputation, and took a chief part in the massacre of Christians in 1860. With the Porte the Druses are generally on hostile terms. There are at present several large fortified barracks on the west slope of the Hauran, but they did not prevent the Druses having a pitched battle with the Turks about four months ago at Suēda.

I had succeeded in obtaining letters of introduction to the powerful family of the Atrasch, which gained me the best reception among the Druses, and opened their houses to me. They conducted me about their mountains and through their villages, and took me to Suēda, Kanantāt, and Bosra—where, according to tradition, the prophet Mahommed became acquainted with Greek civilization and the Christian religion—and further to Sulchad, the largest town in the south-east of the Hauran, as well as to Sāle, north of this place on the east slope.

To the east of the Hauran the boundless desert begins, which forms the peninsula of Arabia, and is bounded on the east by the Persian Gulf, and on the north by the Euphrates. The first part lying nearest to the Hauran is a stony desert called El Harra by the Bedawin, *i.e.*, "the Hot." It measures about 140 miles from north to south; its breadth to the east is not accurately known, but is most likely about the same. It contains several small volcanic ranges, the largest of which is the Safa Mountains. The Harra is a light, rolling plain, and consists of black volcanic blocks, mostly blistered, 12206 to 18309 cubic inches in size, which cover the ground, lying side by side, and rarely on one another, only letting the yellow sandy subsoil be seen here and there. Owing to the traffic which has passed here for thousands of years, some few paths have been formed in this stony desert. By pushing the stones aside room has been found by the hoofs of animals; but riding and pack animals have to go in single file; off these paths it is impossible to proceed. The whole has the look of the crackle on a Chinese vase, on which a crack would represent the road. I could not resist the impression as I rode over it that the Harra was a lava stream which had been poured forth by several craters, especially from Tulul Es Safa, had spread over the desert sands, and first by crystallisation and then by weathering, and the gradual influence of solar heat, had been split into fragments. I can confirm from personal experience the observation of my predecessor, Wetzstein, that blocks of lava in the Harra burst with a loud report.

In the whole of the Harra there is only one well which gives a constant water supply, and that only in small quantities. It lies near Nemāra. In the winter and spring several watercourses from the east slope of the Hauran mountains, and from some of the volcanic mountains of the Harra itself, carry water towards the deepest depressions of the stony desert, which are found on the eastern edge of the Safa mountains. An oasis has consequently been formed here, but not an oasis with palms and other Oriental wonders, but a plain about $18\frac{1}{2}$ miles long, and from 7 to 9 miles broad, which, thanks to the alluvial deposit brought down by the torrents, and the water which is collected here, is suitable to the cultivation of oats and Indian corn. I did not see a single tree in it, and in summer, when all the torrents run dry, it is nothing but a yellow, barren steppe, which affords precarious nourishment to the goats, the sheep

and camels of the Rhiāth. And yet, in comparison to the Harra and the craters of the Safa, the Ruchbe (that is the name of the oasis) appears so beautiful to the Bedawin that they call it "Paradise." In the centre of the Oasis, Sheikh Terak, the saint of the locality, lies buried. Tradition says that he was first buried in the Safa mountains, but the saint transferred himself three times from the tomb prepared for him there to this place, each time with the cry: "Safa is part of hell, Ruchbe is part of Paradise; and I, I deserve Paradise." After the third journey he was allowed to rest in peace.

In Ruchbe is the abode of the Rhiāth, perhaps the most predatory tribe of the Bedawin. They are not on friendly relations with any other tribe, but make raids in every direction, safe themselves against hostile incursions as long as they remain in the impenetrable Harra. They are till now declared enemies of the Turkish Government, and wherever a Rhiāth is seen the Turkish soldiers shoot him. Every effort of the Turks to put an end to the robberies of the Rhiāth has as yet been fruitless. Tosi Pasha, ten years ago, when he was the military Governor of Damascus, invaded the Harra with 10,000 men with the intention of crushing them, but had to retreat without success after losing, it is said, no less than 2,000 men. The only people with whom the Rhiāth are on good terms are their brothers the Schaitje, and the Druses, and there is a special reason for this. They cannot live all the year round in the Oasis or the Harra; at the very latest, at the end of June all the water has been consumed which had been collected in the cisterns and pools, and the Nemāra well is not productive enough. The Schaitje live then on the banks of the meadow lakes to the south-east of Damascus, and the Rhiāth take refuge in East Hauran among the Druses. From this tribe they buy corn, and in return sell them the goods which they have taken when plundering caravans. Thus I found very fine Persian carpets which had lately been taken from a Bagdad caravan among my hosts in Sāle. For the sake of the hospitality shown them in summer, the Rhiāth pledge themselves to spare the property of the Druses. A special bond of union consists in the reverence common to the two tribes for Saint Terāh, whose tomb was rebuilt a few years ago by a wealthy Druse.

It is now quite impossible to penetrate to the Safa Mountains, or even to the Harra, without previously making friends with the Rhiāth, and unless influential Sheikhs of this tribe have undertaken personally to guide the traveller. Previous to my journey only four travellers succeeded in this—an Englishman named Graham, our master in Arabic, Weitzmann, the Frenchman de Vogué, and finally the geologist, Dr. Stübel. Many have been less fortunate in their attempts. I will only mention the celebrated pilgrim to Mecca, Burton, who was compelled, by the guns of the Rhiāth and Schaitje, to retreat from the west side of the Safa Mountains.

I was enabled to penetrate the Harra by the help of the Druses of Sāle. A large part of the Rhiāth had already taken up their summer quarters in the Hauran. Of these one of the Sheikhs who was pledged on oath by Sheikh Serāk undertook to lead me across the Harra, and to deliver me in safety on the other side.

The ride through the Harra was terrible; the animals suffered to an untold degree from the stony paths, and it was fortunate that this ride occurred in the beginning of the journey, when they were all fresh and strong. The heat and reflection of the sun from the smooth and in part glittering stones was almost unbearable. The little water which was only found twice before reaching the Ruchbe was miserable, and, in addition, we were constantly dreading an attack of the Rhiāth. How much reason we had for this may be seen from the fact that near to Nemāra a band of the Rhiāth, numbering about 100, shot at us from an ambush, and would listen to no call, nor attend to any of our signs. Through their fire we had to ride, their

bullets whistling round us, until our companions at last succeeded in making themselves recognised as friends. The disappointment at having to let our rich caravan pass was very evident.

The Rhiath were the only Bedawin on whose hospitality I could not rely during the many months I spent among the Arabs. While I was among them in the Ruchbe a plan was formed to attack me while asleep in my tent at night, and the plot was only defeated by my companion, whom the Druses had associated with me, sleeping with me, armed.

I was repaid for my trouble and danger by the peculiarly interesting ascent of the Safa Volcano. I am the second European who has made this ascent, my predecessor being Professor Dr. Wetzstein, then Consul at Damascus. The Rhiath are very careful in guarding their hiding places in the Safa Mountains, and do not even admit the Druses to them. The ascent to the summit took five hours, and in making it I used the dromedaries of the Rhiath, which are accustomed to climbing. The whole Safa range consists of a mass of lava, showing the most fantastic formations. The mass looks as if it had only cooled yesterday, and close to the craters tubes, some a few centimetres, some several metres in diameter, are visible, from which the melted lava seems to have flowed. Large caves have been formed in many places, which serve in winter and in times of danger as dwelling places for the tribe. The most interesting crater is decidedly that of Suneta. A small part of the ridge shines with red, faintly glowing lava, like a pillar of fire, and underneath the chasm yawns a black oval in shape some 82 feet deep.

Notwithstanding the gloomy wilderness which characterises the Safa, there is a flora, though of the scantiest kind. I found some plants growing even in July when I visited the range, and was able to bring away specimens of about thirty species. In one of the craters of Tulul the Rhiath are said, in times of necessity, to have grown barley, some twenty or thirty years ago. Animal life is also not quite extinct. I saw traces of hyenas and several very pretty blue lizards. At the time when I visited the volcanoes they were of course uninhabited, but there were very visible traces of winter settlements.

We spent the night on the mountains, and on the following day we visited the chief ruins of the Ruchbe (which is rich in old buildings), namely the Kasr el Atrad, "the white castle," just at the foot of the volcanoes. All the ruins date from the time of the Rhassanides, that race of art-loving rulers, an Arabian tribe not yet sufficiently known, who emigrated from South Arabia about the beginning of the Christian era, and flourished especially in the Hauran. More than once, especially in the Ruchbe, I was reminded by single ornamented stones of the arabesque form of decoration which is still popular among the Arabs. The rule of the Rhassanides in the Hauran was ended by the invasion of the Persians under Chosroes in the beginning of the 7th century. In the Ruchbe the lords of the White Castle maintained themselves to the time of Tamerlane, according to local tradition; and since then, in the most miserable tents I have ever seen, their degraded and ragged cousins, the Rhiath, live there.

Similar remains of the Rhassanides I found in the ruins of a well-preserved large town at the foot of the Djebel Sās, another isolated great crater to the north-east of the Safa mountains. Very many inscriptions, as well as figures of camels, women, and suns, on the upper ridge of the crater, point to the old Arabic origin of the extinct population.

That the Romans at one time had taken a firm position in the Harra is proved by the Roman inscriptions in the guardhouse of Nemāra, and also by the distinct trace of a broad Roman road to the north of Nemāra. I wish to add that from the

Castle of Salchad I could distinctly trace the often doubted Roman road on the south slope of the Hauran, leading thence in a south-east direction into the desert. Tradition maintains that it went as far as Basra, on the Persian Gulf.

Two hours before we reached Djebel Sēs we found in a hole in the rock, about 3½ ft. broad and about 1½ ft. deep, some water which had collected from the drainage of the plateau at the foot of the Sēs, and had remained to this late season, while in the spring it flows down to the Ruchbe as a brook. As might be expected, the basin was only a brackish pool covered with green slime. We removed the slime and drank all the water, except what we used to fill our water-skins. A messenger had been previously sent from the Ruchbe to see if any water could be found here. From the Djebel Sēs our route took a north-west direction to Dumēr, where, for the first time after leaving the West Haurān, we found a body of Turkish gens-d'-armes. The march, which on account of the complete want of water had to be completed, with a short interval of rest, in two days, occupied about thirty hours.

I spent twelve days in the Harra, and the whole route which I traversed from Sāle to Dumēr was new. My four predecessors in the Harra had followed different roads. Many of the places marked on the special map of Wetzstein and Stübel, being fixed by hearsay, will have to be amended.

From Dumēr I at first turned eastward in the direction which the Turkish camel post takes on its way to Bagdad. Every week one or more camel riders start, according to necessity, from Damascus by way of Dumēr to Bagdad, or *vice versa*, across the desert with a letter bag. Each rider takes two camels with water and fodder. The Turkish Government has concluded agreements with all the Bedawin tribes of the district traversed, according to which their postmen are left unmolested.

Our road led us by a valley-like depression, one and a half to three miles broad and about thirty miles in length, which is in summer a steppe without water, but which after the rains forms excellent pasture land for the great Bedawin tribe of the Roalla. The southern boundary of this depression is formed by the volcanic region we had just left, and the northern boundary consists of the last spurs of Anti-Lebanon. On the way, at a few hours' distance from each other, we passed two old castles, quadrangular in shape, flanked by towers at each corner, and enclosing gigantic courtyards; outside of them reservoirs of water were visible. These castles were landmarks, and, being garrisoned with a small number of troops, served as well-protected places of refuge in the time of the Caliphs, when the Abbassides ruled in Bagdad, for the protection of caravans trading between Bagdad and Damascus. Between Palmyra and Dēr-er-Sūr I found more of these castles, as also in the valley of the Chabur. At present the castles are in ruins and the reservoirs filled with rubbish.

Shortly before the southern ridge retreated, and gave way to the Hamād, the real desert, we turned in a direct northerly direction. Our object was to find the Spring of Subēde, often named by all the Bedawin of that district, but marked as yet on no map. It is said to rise high among the mountains. We had sent our caravan by another road in advance of us. We ourselves consisted of a troop of 20 horsemen, reinforced at Dumēr, as the Subēde has a bad reputation as a place visited by caravans of robbers. The ascent of the mountains was difficult, and we were obliged to lead our animals. Almost without a visible road we had to ascend a steep, rocky path, often passing along by deep precipices. The whole mass of the mountains consisted of limestone, was much jagged and broken, and reminded one of the most beautiful parts of the Saxon Switzerland.

At last we reached the summit. The well was no fable, and was found very near the highest point of the mountain, 4,266 ft. above sea level, on the southern side of the mountain, with an overhanging mighty block of rock, and protected against the

sun's rays. It was surrounded by scanty verdure. The water had to be drawn up several yards, and was delightfully cool, but with a slightly bitter taste.

The view we enjoyed from this spot was wonderful. At our feet lay the long valley already spoken of, with the ruined castles ; behind us, the black, wild Harra, from which each isolated crater rose distinctly ; and to our left the boundless desert stretched, with its indescribable colours and shades on each side, with the fitting background of the weathered peaks of the Subede mountains and their neighbouring ranges.

We could not stay long at this wonderful point. The traces of a caravan, which had most likely been here the night before, made us think soon of departure. We crossed the mountain range by a pass, which descended first as steep as the ascent had been, and then our road led us across several parallel ranges of small elevation to our quarters for the night, by another well, situated this time in the steppe.

According to the existing maps there are only one or two parallel chains of mountains. I counted along the road four, five, and sometimes even more that deserved mention.

But I cannot enter upon details here. I would only mention that on our road to Palmyra, which went considerably to the south of the caravan route, we came across two isolated twin volcanoes, which contrasted sharply with their black colour against the light-coloured limestone ranges. Their names were Abd and Abde (male and female slaves). They were both conical, the one pointed and the other flattened with a depression at the summit.

Soon afterwards a white, large, but not lofty chalk range of hills attracted our attention from a distance, the Dubel Hufayir. Here we heard there were wells, but we were not privileged to see them from the following reasons. A short time before we, who had ridden somewhat in advance of our companions, had been shot at by Bedawin, who soon retreated behind the hills which extended before us to the southward. We then learned from our rear guard that they also had seen at some distance some 150 camels, each carrying two persons, marching to the south of us. These circumstances made it certain that these Bedawin were Rhasu (a predatory horde). On their more extensive raids the Bedawin like to put two men on each camel, of whom one dismounts in case of emergency, so that they are able to have at once a force of cavalry and of infantry. There is the special advantage that the men who have dismounted can collect the grazing camels, and the others belonging to the caravan which is attacked, and drive them off as booty to their own camp.

With all possible precautions we approached the chalk hills, and reached them shortly before sunset. Our attempts, however, to find the wells were fruitless, for scarcely had we taken any rest before Bedawin began to appear, and immediately to fire at us. Without doubt they had found the water, and taken possession of it, and after a short council of war we decided to proceed as soon as possible, and that by a zig-zag route, so as to avoid the Rhasu. We were obliged to ride the whole night, till our caravan, exhausted by thirst and exhaustion, arrived a few hours before sunset in Kariaten. In this manner we were unfortunately driven from the southern route to Palmyra, which we had intended to take, on to the ordinary caravan road. On this road we found a well called Ain-el-Beida, near to which a small fortified guard-house was built, the garrison of which consisted of a small force of from three to twelve men. This small troop is quite sufficient to protect the well from the Bedawin, who are out on robbing expeditions, and cannot lay siege to them, as they themselves require a water supply. It would not be difficult, by such garrisons at all the wells with constant water supply in the Syrian desert, for the Government to put an end to the robberies of the Bedawin, at least in summer, the very time in which

at present the desert is most dangerous to the trade caravans, owing to the want of water, and the presence of the wandering hordes of bandits, who, like the caravans, are dependent upon these few watering-places.

I should not like to leave unmentioned a natural phenomenon, which I observed between Kariatén and Palmyra, on the 24th July: a terrible storm from the west-south-west, with scanty fall of rain, thunder and lightning, and blood-red sky, with almost black air.

Palmyra and its noble ruins, the most beautiful I have ever seen, are too well known for it to be needful for me to describe them. In the same way the road from Palmyra to Dêr-el-Sôr, a part of the great caravan road from Damascus to Bagdad, is well known; it extends till about two days' journey from Bagdad along the Euphrates.

I was able in Dêr-el-Sôr, a rising town on the right bank of the Euphrates, to make friends with the Shammar Bedawin. The Shammar have the reputation of being the noblest Bedawin tribe of North Arabia. Their sheikhs trace their descent to the time of Mohammed. Ibn Raschid, the all-powerful lord of the Nejd and of all Central Arabia is a Schammar, and from Orfa to Bagdad, through the whole of Mesopotamia, the Schammar are to be found.

The Mesopotamian Schammar are divided into the northern Schammar, whose pasture lands extend to the line of Mosul Dêr, and who recognise Sheikh Faris as their chief. Those who live to the south-east of these, as far as Bagdad, are followers of his nephew, the sons of his late brother, Sheikh Ferhân. At present the Turkish Government is on good terms with both tribes of Shammar. It has made Faris, and the two oldest sons of Ferhân, Pashas or Beys, and pays them large annual salaries. In return the Shammar have undertaken not only not to plunder the rafts on the Tigris and Euphrates, but to protect the navigation of these rivers, and even to pay a certain tax for their sheep and camels. For the defence which the Schammar profess to give the villages on the Tigris against the attacks of other Bedawin tribes—especially of the Anesi—they demand so-called brotherly tribute, "Chuwe," a peculiar tax amounting to 100 or 150 per cent. of the taxes which the villages have to pay to the Sultan, but in addition special contributions are demanded when Faris, or some one of his people, visit the villages.

The present tolerable relations between the Turks and the Schammar is of late date. The father of Faris and Ferhân was hung as a common rebel on the bridge of Mosul. The same fate may possibly meet the sons of Faris; it would not be impossible to happen even to himself.

Of late the Porte has tried to civilise the Bedawin, by educating the sons of influential Sheikhs in a special school in Constantinople, and by forcing small tribes to settle down, build houses, and cultivate the land.

It happens often enough that the Bedawin who have been thus compelled to settle down as agriculturists are oppressed so severely by their former friends and kinsmen, that they leave their huts, seize lance and rifle again and return to their old status of free sons of the desert.

There is, in my opinion, only one way of dealing with the Bedawin, and that is the development of power, strong garrisons with good regiments mounted on mules, horses, or camels, who can hold the Arabs in check, pursue them systematically, and punish them severely if they levy black mail on peasants, or plunder them. If nothing else can be done, the whole race should be expelled from Mesopotamia, and driven into the Arabian desert. In addition, incorruptible governors should be appointed, who would really attend to the grievances of the peasantry. The Porte proposes to attempt both methods, and has to some extent begun the work. If she

were to carry it out with power and perseverance, Mesopotamia, this great country, which once served as the granary for entire kingdoms, but which is now in great measure a barren steppe, could once again become one of the richest and most fruitful districts of the earth.

As already remarked I had been able to come to terms with the Schammar while in Dêr-el-Sôr; it was owing to the intervention of the energetic Turkish Mutessarif (President) of Dêr. Accompanied by them I took a direct new road from Dêr-el-Sôr to Samar on the Chabur, in order to follow the little-known course of the river upwards.

Professor Sachau, who visited the country in the winter of 1880, during the time of the famine, was obliged by the force of circumstances to take the direct road to Mosul, South of the Sindjar; but Dr. Moritz, of the Royal Seminary for Oriental Languages had travelled before me along the Chabur, in the opposite direction, from Arban to the junction with the Euphrates.

At Arban, the noble pillars of the Chabur bridge, which dates from the time of the Caliphs' are still standing, ornamented with inscriptions, and the colossal mounds, not yet fully explored, containing the remains of an Assyrian city. In a cave at this place the great stone Assyrian bull with a human head awaits transportation to a European museum.

From Arban I travelled by an entirely new route almost as far as Mosul. My first stage was further along the valley of the Chabur to the Djebel Kokep, which lies on the right and not on the left bank of the Chabur, as the maps show; opposite to it there is another large mound of ruins containing, no doubt, the remains of another ancient city. I then went along the Rad and Djardjar to Nesibin, the old Nisibis which played so important a part in history. Here some 20 of the Sheikh Faris people met me to lead me to his camp. At their head was the handsome son of the Sheikh, twelve years of age, armed with dagger and a spear nearly twenty feet long, about four times the size of the little hero himself. I was conducted by way of the camp of the superior Sheikh of the Tai, to the tents of Sheikh Faris, which were pitched to the north of the Sindjar and spent three days with him as his guest. In the camp of the Shammar, as altogether on my whole journey, I had opportunities of becoming accurately acquainted with the life of the Bedawin, and to make this report more clear should like to sketch some of its salient features.

Grouping themselves in patriarchal fashion round the families of certain chiefs (Sheikhs) these sons of the desert, who love freedom and open air life more than anything, live in tents which according to their need can be pitched or struck. As long as the pasture grounds caused by the rain in the steppes give food and water, the separate tribes wander with their camels, sheep, goats, and horses in nomad fashion through the desert, each keeping to fixed districts. The boundaries of these districts are changed at times in consequence of sanguinary struggles among the tribes, which often last for more than ten years, and from the relative conditions of power arising from them.

In summer if possible river valleys and the places round constant springs which are thus rendered fruitful are in great request. The largest camps are pitched and struck with incredible speed. Each larger tent has two divisions, the lesser for the women, the larger for the men. In the tent of Sheikh Faris more than 100 men could sit comfortably. Women are more respectfully treated by the Bedawin than by the dwellers in towns, but are expected in return to do all kinds of work; they enjoy greater freedom, have more influence in the family, and go about unveiled. When I once expressed a wish to one of the Sheikhs of the Shammar, one of the sons of Ferhân, to see the women's part of the tent, he regretted that I had not named my wish before so that his wives might have ornamented themselves, but if I wished

to see them without preparation I could do so. I then visited his three wives; the eldest of them lived in the woman's part of his tent, while the others had their own separate tents.

While the women are never allowed to enter the man's side of a tent, horses are allowed to put their heads in the part of a tent reserved for men, to enjoy the shade, but only the mares; indeed the mares are valued far more than the stallions, being considered more valuable even than human beings, the blood money for killing a mare being higher than that for a man who has been slain. An Arab makes a present of a mare, or sells it, with great unwillingness, while he gladly sells stallions, keeping one stallion only to a large number of mares. I would add that the export of mares from Turkey is at present prohibited. The wealth of many tribes in quite pure blood horses is not so great as is often assumed; in some camps the half bred are in a majority, and only individual tribes like North Shammar and Anesi boast that they only have full bred horses.

As to property in horses and the obtaining of the same a very curious customary law has become binding among the Bedawin of North Arabia. If for instance a mare is seized in a Rhasu (a predatory raid), and by any chance it or any descendant of it falls into the possession of the tribe to which the original mare belonged, it has the right to take the horse, without compensation, from the latest conqueror, but must give the man who told him where his horse was, according to local custom, a camel or a certain number of sheep, even if the informant is the first robber.

The method of living among the Bedawin is very simple; their nourishment consists mainly of burgul, a kind of porridge made of roughly ground maize. Rice, thin cakes of bread, but especially mutton, are considered delicacies. According to Mohammedan usage people eat with the right hand. The partakers of a meal squat on the ground in a circle round a dish of about 1 foot 6 inches in diameter, and as soon as they have satisfied their appetite they make way for new guests. As the Bedawin eat with wonderful speed 60 to 70 persons are able to be fed in a quarter of an hour. In enduring hunger, thirst, and other troubles the Bedawin do wonders.

Corresponding to their simple method of living, the appearance of the Bedawin is thin. They have brown to dark brown complexions, large, fine, black eyes, and a scanty beard. The women are also thin and age very soon. Among the younger ones I saw some who were very beautiful.

The Bedawin have something noble in their manners by nature, and they lay great importance on polite ceremony. Everyone behaves like a gentleman, when in accordance with the old custom of Arabian hospitality he receives a guest in his tent; but the habits of the Bedawin do not always correspond with this external noble appearance. Greed is the fundamental principle of their character; it shows itself towards the guest in camp in the form of persistent beggary, and towards the stranger outside as the most unrelenting robbery. All education is directed to make able bandits and to render raids successful. These are undertaken to increase the number of cattle, to revenge attacks, or to plunder caravans. From early childhood they are trained in the use of arms, and successful robbery is rewarded. On the other hand generosity is highly esteemed, and is the chief quality which a tribe demands of its Sheikh. It is his business to obtain the means to satisfy the demands of his people.

The best characteristic of the Bedawin is their high esteem of domestic life and their family affection, which runs into the worst form of deadly feud. To revenge the death of a member of the tribe, whole tribes have now and then been brought to the verge of destruction.

Religion plays a very subordinate part in Bedawin life. Most of them do not even know how to perform the prescribed offices of devotion. Even Sheikh Faris, who, in my presence, often wished to play the part of a pious Musselman, was not able to perform the ritual movements without clumsy mistakes.

The dress of the Bedawin consists often of nothing but a shirt, with wide arms, originally white in colour, but soon assuming an altogether indefinable tint. Frequently an Abāje is worn over this, a cloak open in the middle of the front, brown or striped, with two colours, square-shaped, with armholes. Their covering for the head, Kefie, consists of a square cloth, which is folded diagonally, and is fastened on the head with a thick camel's hair rope. As peculiarly ornamental garments, horsemen wear coloured silk Captans and red boots reaching to their calves.

Long spears and bad swords form the ordinary weapons, but all kinds of guns, from matchlocks to modern repeating rifles are seen.

The women, as a general rule, only wear a shirt, ordinarily of a blue colour. They are fond of silver ornaments, and are often tattooed, especially in the face and on the hands, with broadly intertwined patterns. This description of the Bedawin is suitable to all the tribes of the North Arabian and Mesopotamian desert; only the Stēbi differ materially from the others. They do not traverse the country from the Persian Gulf to Syria in tribes, but like gipsies of the desert in separate families. Their ethnographical origin is not yet determined, but they are most likely not of Semitic but Indian descent. They are of an altogether different type to the Arabian Bedawin; they are less in size, and dress generally in the skins of gazelles; their chief occupation is hunting gazelles. They abstain from raids, and are on good terms with all the tribes. No Bedawin knows the desert as well as the Stēbi, and in return for the hospitality which is ever shown to them, and for the respect which is paid to their small property, they act everywhere and for every one as guides. They have neither horses nor camels, and ride small asses of a peculiar breed and great power of endurance; rarely do they keep a few sheep or goats. The Stēbi are in the habit of burying their dead in large common cemeteries—one, for instance, can be seen a little south of Palmyra, while the other Bedawin generally bury their dead where they die, only choosing the summit of the nearest hill as a burial place for their Sheikhs.

Returning to the further course of our journey, after Sheikh Faris had given me a horse as a parting gift, he sent some of his people to guide me along a zig-zag path through the Steppe to Mosul. My road led me to every place where old ruins were expected; thus we reached the Tigris before Mosul, the first time at the Karatschork, where I was able to determine the junction with the Tigris of a large affluent holding water even in summer, and the second time at Eski-Mosul. On this road I was fortunate in finding several extraordinarily well preserved towns of the time of the Caliphs, in addition to innumerable Tells (hills), containing in many cases ruins and rubbish heaps, the Arabic names, and, whenever possible, their Turkish and Curdish names I have noted.

Unfortunately I was unable to reach the Jesides. This tribe, of Curdish descent, lives in the mountains north of the Karatschork, and especially in the Sindjar range of Mesopotamia. They have a peculiar religion, in many respects allied to the old Magian faith; thus they worship the principle of evil, and kill everyone who pronounces the name of the devil "Schitan," in order to avoid any evil which might hence affect the tribe. In oracular manner this evil principle speaks through a demon figure with a bird's head. Their religion is altogether dependent on tradition—a fact which caused a Governor of Mosul, a short time ago, to insist upon their accepting either the Old or New Testament or the Koran, failing compliance with which he threatened to treat them as Kuffār (unbelievers) in the sense of the Koran. The Jesides refused

and just when I was in Mesopotamia the bloody war, which was consequently made upon them, had begun. The half of the garrison of Mosul had started for the Sindjar to annihilate them, and the traditional skirmishes and fights between the Jesides and their hereditary enemies, the Mesopotamian Shammar, had broken out more vigorously than ever in the neighbourhood of the Sindjar, especially as the Jesides to the north of the Tigris had collected themselves together near the Sindjar, to help their fellow-believers in the desperate combat, the result of which has not yet reached us in Europe.

Being personally mistaken for one of the Jesides had almost proved fatal to me in the neighbourhood of the Karatschork. We were taken for Jesides by the Bedawin tribe of the Djetsresch. Fortunately they were friends of our Schammar. We were suddenly surrounded by about 150 horsemen with long lances. The explanation of the misunderstanding caused our assailants as much pleasure as it did us, as in the previous night they had lost thirty men in a combat with the Jesides, and had now come out to defend their wives and children against a new hostile incursion.

In Mosul my land journey came to an end. From this place I sailed on a "kellek," one of those primitive rafts, dating from Assyrian time, consisting of rows of inflated goatskins. They are still the only vessels in use on this part of the river Tigris down to Bagdad. I followed the river road in order more easily to visit the interesting ruins on each side of the stream.

After a journey of six days I reached Bagdad in the beginning of September. I found the cholera raging with great severity, and incredible quarantine precautions prevented my visiting Kerbela and Hilleh. I therefore continued my journey on the Tigris, making use of one of the two English steamers which conduct the traffic, together with some Turkish steamers between Bagdad and Basra. After a short stay in Basra I sailed in one of the British India steamers down the beautiful Schatt-el-Arab, which especially in the neighbourhood of Basra is framed with luxuriant palm woods. In the harbour of the Persian fortress Mohammera, where the Kanu joins the Schatt-el-Arab at the frontier of Turkey and Persia, is the whole Persian fleet in the shape of a single steamer, the "Persepolis," which was under the command of German officers.

The return journey from Turkish Arabia brought me to the harbour on the south coast of Persia, then to Marcat, the Sultan of which place received me in audience, and after a visit to the Mohammedan North of India, I reached Aden, whence I visited Zanzibar and the coast of our East African colony. Thanks to the kind courtesy of our governor of that place, von Schele, I was enabled to take a short trip from Pangani into the interior, to Bondei and Usambara. I should like to say here that the wonderful magnificence of the virgin forests of Usambara and the whole beautiful vegetation of the district surpassed anything of the kind I had seen in North Africa, in South Mesopotamia, or India.

The Sixth International Congress of Geography, to be held in London in 1895, will be an important meeting. A good many members of the Manchester Geographical Society will doubtless desire to take part in the work of the Congress, and the Secretary will be glad to have early intimation from those who intend to be present. The Royal Geographical Society is taking an active part in the preparations, and the Chairman of this Society has been added to the Executive Committee. It is possible that some of the distinguished strangers may visit Manchester.

THE SUAKIN-BERBER ROUTE TO THE SUDAN.

(See Maps and Diagram.)

By LIEUT.-COL. C. M. WATSON, R.E., C.M.G.

[Addressed to the Society, in the Memorial Hall, Wednesday, February 23rd, 1894.]

ONE of the great questions of interest at the present time is the opening up of the central regions of Africa to civilisation and commerce, and this is a question of special importance to all who are anxious for the wellbeing and increase of British trade and for the development of new markets for British manufacturers. That great continent, which for so many years had been practically a sealed book, has during the last quarter of a century been explored from north to south and from east to west, and its internal features and capabilities are becoming better known every year.

It is difficult, perhaps, for the present generation to realise the great progress that has been made in African discovery, but if any one will take the trouble to look at an atlas of fifty years ago and to compare the map of Africa therein with a map of the present day, he will see at a glance how little our fathers knew of countries, rivers, and mountains, which are now as familiar, in name at least, as places in our own islands. The interior of the country seems to have been considered as a vast desert, with some mountains here and there, but there was no accurate information. The discoveries made by Livingstone, Burton, Speke, Grant, Baker, and other travellers, whose names are well known to all interested in geographical discovery, have entirely altered our acquaintance with the continent, and have enabled it to be mapped out with very considerable accuracy.

Following the period of exploration has come the epoch of distributing Africa—so far as political influence is concerned—among the various nations of Europe, and now there only remains a comparatively small portion not so allotted.

As there may be some present who have not had the opportunity of following the various treaties under which the conti-

nent has been allotted among the different powers of Europe, I have shown, generally, on Map No. 1, the various colonies and spheres of political influence, and have given in the corner of the same map a plan of the United Kingdom of Great Britain



Map. No. 1.

and Ireland on a similar scale, thus indicating, better than can be done by any verbal description, the enormous area of the territories under consideration. Putting it in round numbers, the United Kingdom has an area of 120,000 square miles, while Africa covers more than 11,500,000 square miles. Of this, about

8,500,000 has been allotted among the European powers, in the following proportions:—

| | Square Miles. |
|--------------------------------------|------------------|
| British Africa, including Egypt..... | 2,250,000 |
| French Africa | 2,750,000 |
| The Congo Free State..... | 880,000 |
| Portuguese Africa | 850,000 |
| German Africa..... | 800,000 |
| Italian Africa | 600,000 |
| Spanish Africa | 200,000 |
| South Africa Republics | 170,000 |
| Total..... | 8,500,000 |

The portions of Africa so divided may be thus briefly enumerated:—

Commencing at the north-east corner of the continent, we have first the territory of Egypt, which is under British protection at the present time. Next to it on the west, also on the coast of the Mediterranean, is the country of Tripoli, a province of the Turkish Empire.* Then follow Tunis and Algiers, now practically a part of France, to the south of which lies the French hinterland, as recognised by treaty, stretching as far south as the Niger, and bounded on the east by a line drawn from Tunis to Lake Tchad. Next Algiers comes the native state of Morocco, a country the future of which is a matter of considerable interest.* South of Morocco, on the Atlantic coast, is a large area under Spanish influence, and then continuing southward the greater part of the country is under French influence, with the exception of the British and Portuguese colonies on the coast. Passing round the north coast of the Gulf of Guinea we come to the British protectorates of the Niger and Oil Rivers, and then to the German protectorate of the Cameroons. To the south of this are the Congo regions, divided between the French protectorate and the Congo Free State, which is under Belgian political influence. South of the territories of the Congo State, on the west coast of Africa, is the Portuguese colony of Angola, and to the south of this again the German South-West African protectorate. This brings us to South Africa, where the British influence is predominant, with the exception of the territories belonging to the Transvaal and Orange Free State republics and the Portuguese possessions on the Indian Ocean. Opposite to the latter is the great island of Madagascar, where French influence is predominant.* Passing to the northward, along the east coast, we next come to the German East Coast protectorate, and adjoining this to the territory allotted by royal charter to the British East African Company, who have done good work in opening up this part of Africa. North of the British sphere

* The territories of Tripoli, Morocco, and Madagascar are not included in the 8,500,000 square miles referred to above.

is a vast territory, including Abyssinia, reserved for Italian influence. It will be seen that the only large portion of Africa not yet very definitely allotted comprises the valley of the Nile and the districts to the westward. The British East African Company had some claim to extend into these regions, but the chance of their so doing for many years to come is problematical, as the natural road of approach to them is from the north and not from the south. A large part of these Nile regions formed the Egyptian Sudan, and were governed from Cairo until the year 1884, when the Mahdi rebellion, followed by the abandonment of the Sudan, led to the complete withdrawal of Egyptian influence from the basin of the Nile. The limit of Egypt to the south is now a line drawn from the Second Cataract to the Red Sea, and a narrow strip of land along the coast of that sea, as far south as the point where the Italian sphere of influence commences.

Leaving the other portions of Africa, I wish to direct attention particularly to the valley of the Nile and the countries adjacent to it. In Map No. 2 these countries are shown on a larger scale than in the first map, including the district of the great equatorial lakes, which form the headwaters of the giant river. Of these, the most important is the Victoria Nyanza, one of the largest inland seas of the world, covering an area of about 27,000 square miles. On its northern shore is the interesting country of Uganda, recently brought to the notice of Englishmen by the advance of the British East African Company and its indefatigable officers. The names of Lugard, Williams, Macdonald, and others are too well known for it to be necessary to more than allude to the energy and devotion with which they have pushed forward to the Lake region, to the Victoria Nyanza, and to the smaller lakes to the westward, the Albert Edward, and Albert Lakes. Uganda has been definitely taken under British protection, but the exact mode in which it is to be governed is still undecided.

Those who wish for further information regarding this part of Africa should read Captain Lugard's exceedingly interesting work, and the Parliamentary Blue Books containing the official reports of the late Sir Gerald Portal, who was sent as Special Commissioner to examine into the state of affairs in Uganda and the districts surrounding it. The Report on the Railway Survey of the proposed line from Mombasa to the Victoria Lake by Captain Macdonald, R.E., presented to Parliament in 1893, also contains a great deal of very interesting information, and deserves careful perusal by all those who wish really to understand the subject. At the present time, when the route from Mombasa to Uganda is proposed by some as a better route to Khartoum than that from Suakin *via* Berber, it is particularly important to study both roads in order to appreciate their relative advantages and disadvantages.

For the benefit of those, however, who have not the time to make a real study of the question, I will say a few words respecting the course of the Nile north of Uganda.



Map. No. 2.

The Nile rising in the Victoria Lake, at a height of 3,800ft. above the sea level, falls rapidly to the Albert Lake, then runs more quickly to the Fola rapids, whence the river is navigable for a distance of nearly 1,400 miles to Khartoum, receiving on its

way thither the waters of two other large rivers, the Gazelle and the Sobat.

A few miles to the north of Sobat junction is the town of Fashoda, which, when I visited it some years ago, was a flourishing centre of population, with good plantations of cotton and sugar-cane. Corn was grown in considerable quantities, and the country gave good promise of future development.*

At Khartoum, the Nile, which down to that point is known as the White Nile, is joined by another great river, the Blue Nile, that flows from the mountains of Abyssinia, and is navigable for hundreds of miles above the point of junction. From Khartoum, the river continues its course northwards, and 200 miles further is joined by its last tributary, the Atbara, which brings down a great deal of water during two or three months of the year, but cannot be regarded as of much use for commercial purposes. From the mouth of the Atbara to the Mediterranean, a distance of 1,650 miles, the Nile receives no other tributary, but flows through a country which, if it were not for the fertilizing waters of the river, would be a desert. It is hardly necessary to point out what an important element in the question of opening up the Sudan to commerce is contained in the fact that there are so many hundreds of miles of navigable river from Berber to the South, greatly facilitating the possibilities of commerce. But, on the other hand, the Nile below Berber, and from that town to the frontier of Egypt, is unfit for navigation. There are, of course, stretches of open water here and there, but these are so divided from one another by cataracts and rapids that to use the Nile for navigation is practically impossible.

I might mention as an instance that when Sir Samuel Baker was sent to Khartoum some steamers were sent from Cairo to that place by way of the Nile, and they took nearly two years to accomplish the distance. Again, when the English expeditions went to the Sudan, in 1884, whale boats, to be rowed by the soldiers, were provided to enable the force to pass the many rapids which made navigation by steamer from Egypt to Berber impossible. But while we may regret that the cataracts of the Nile render river navigation from Egypt to the Sudan impossible, it must not be forgotten that these cataracts are of the greatest possible value to Egypt from an agricultural point of view, because they hold back the waters of the Nile and prevent it flowing too rapidly into the valley of the river north of Assuan.

River navigation to the Sudan being thus impracticable, the

* By the treaty recently made between England and Belgium, the left bank of the Nile, from the north of the Albert Nyanza to Tashoda, has been handed over on a lease to the Congo Free State. (See Parliamentary Papers, Africa, No. 4, 1894.)

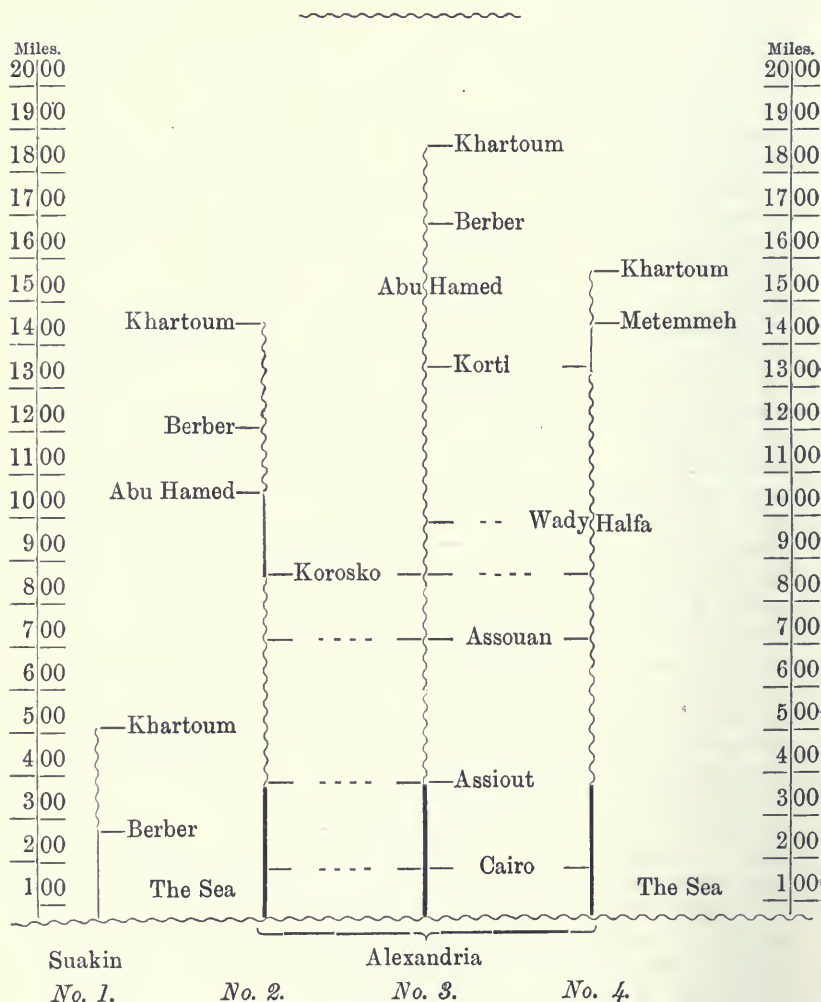
trade from Egypt was principally carried on by camel transport, the two roads most used being those from Suakin, on the Red Sea, to Berber, and from Korosko on the lower Nile to Abu Hamed and Berber.

By looking at the map, it will be seen at a glance that the road from Abu-Hamed to Korosko crosses the narrowest point of the great bend which the Nile makes to the south-west, north-west, and north-east, so that while the distance by river from Abu-Hamed to Korosko is about 670 miles, the length of the road between the same two points is only about 240 miles.

This road passes through real desert. There is only one well of brackish water about midway, and it is necessary for travellers to carry all water for drinking with them. Prior to the Mahdi rebellion, and the abandonment of the Sudan, although the Suakin route had many advantages, the latter was not encouraged by the Egyptian Government, which preferred that the Sudan trade should pass through Egypt instead of passing out of the country at Suakin. Notwithstanding this, however, a good proportion of the trade took the latter road, which was far pleasanter for travelling, as there is no lack of water and plenty of trees and verdure to refresh the eye, and give sustenance to the camels—a very important consideration in this mode of transit. A fourth route, from Khartoum to the sea, should also be alluded to, as it was that followed by the English Nile Expedition in 1884-5. It is marked on Map No. 2. When going by this route, from Khartoum to Cairo, the Nile is left at Metemmeh, and taken up again at Korti.

The annexed diagram (No. 3) illustrates the comparative length of the different roads alluded to, and from this it is easy to see the vast superiority of the Suakin-Berber road for commercial purposes. As I have already said, the river route south of the Second Cataract is unfit for navigation and may be left out of consideration. The use of the Korosko Abu Hamed road necessitates frequent transhipments. For example, suppose it was necessary to forward a bale of goods by this road to Berber, it was landed at Alexandria, on the Mediterranean, and sent 360 miles by railway to Assint, whence it was forwarded by boat to Assuan, a distance of 312 miles. At Assuan it was sent by a short railway round the first cataract, and then placed in another boat for conveyance 112 miles by river to Korosko. At Korosko it was loaded on a camel, and sent on to Berber by road, a distance of 410 miles, thus making a journey of about 1,200 miles with four transhipments *en route*. It is hardly necessary to say that such a mode of conveying commerce was prohibitive except for valuable articles. The road from Suakin to Berber, on the contrary, was only 260 miles in length and no change of conveyance was required.

DIAGRAM SHOWING THE COMPARATIVE DISTANCES FROM THE SEA TO KHARTOUM, BY THE FOUR DIFFERENT ROUTES.



No. 1.—Suakin-Berber Route.

No. 2.—The Korosko Route.

No. 3.—The Nile Route.

No. 4.—The Bahiuda Desert Route, taken by the Expeditionary Force.

Diagram No. 3.

At Berber goods were either placed in a boat and taken to Khartoum by the Nile, or else by camel along the river bank. As at the time when the Nile was low and the passing of the Sixth Cataract presented difficulties, the Atbara was also quite low and could be crossed without trouble, the camel road had advantages during some months of the year.

In order to avoid the difficulty and expense of sending goods to the Sudan and *vice versa* by the Korosko road the late Khedive, Ismail Pasha, proposed to make a railway from Wady Halfa to Metemmeh, above Berber, following the course of the Nile as far as Korti and thence striking across the desert, and this line was commenced and carried a few miles south of Wady Halfa. But further progress was stopped by want of the money required for the project, and one cannot feel any regret that more was not spent on such a chimerical project.

An unbiassed examination of the different routes can only lead to the conclusion that the true route to the Sudan is by way of Suakin-Berber. That there would be no difficulty in making a railway by this road I now propose to show you.

The distance between the two places in a straight line is about 230 miles, and the road as travelled by caravans is variously estimated at from 250 to 270 miles. Probably the mean of these, 260 miles, is not far from the truth.

The track is very good for camels, and could easily be made available for wheeled traffic, although a road, in our sense of the word, has never been made at all.

As there are many wells on the road, and as others could be sunk without difficulty, the question of water supply would give no trouble. Those who are acquainted with the vast improvements made by the French by sinking wells in the Algerian hills will realise how much could be done in this way along the road.

After leaving Suakin, the first wells are at Handub, a few miles from the coast, and the next at Otao, nineteen miles from the sea, and at an altitude of 850 feet above it. It was to this point that the 4ft. 8½in. gauge railway was laid from Suakin in the spring of 1885, as a military line. The road beyond Otao rises gradually and attains the summit level of 2,800ft. at a distance from the sea of 70 to 80 miles, whence there is a descent of gentle slope to the Nile at Berber, which town is at a height of about 1,150ft. above sea level. Looked at from the point of view of railway construction, the line presents no difficulties. There was not the slightest difficulty in 1885 in making the line to Otao, and none was found from that place to a place beyond Tambuk, thirty miles from the sea, up to which point the country was surveyed. It was found that water existed in the valleys, wherever wells were sunk, and that the supply was practically inexhaustible.

Colonel Prout, a very intelligent officer who served under the late General Gordon in the Sudan, and who was ordered to make a reconnaissance with a view to the possible construction of a railway, reported that a line could be built for the greater part of the road with ease and economy, that the surface throughout was such as to require little earthwork, and that on one point only on the line, near the summit level, would heavy rock cutting and possibly a tunnel be necessary. Compared with other mountain lines, he considered that the Suakin-Berber railway could be cheaply constructed and profitably worked.

There is one section on the latter part of the caravan road, where it crosses a sandy plain for some miles, and this might give a little trouble. It may, however, perhaps be avoided by keeping further to the south, and reaching the Nile between Berber and the mouth of the River Atbara.

There is another point to which attention should be directed, in case the construction of the railway is seriously contemplated. The caravan road starts from Suakin on the Red Sea. Now, Suakin is an excellent harbour, but it has the disadvantage that, in consequence of the great coral reefs which stretch to the north and south of it, navigation is dangerous except during daylight. But about thirty miles to the northward of Suakin is another natural harbour, called Mersa Sheikh Barud, which, judging from the Admiralty charts, is quite as good as, if not a better port than, Suakin, and it has the very great advantage that it lies opposite to a break in the coral reefs, so that if a lighthouse were erected it could be entered safely by night as well as by day. A railway from it towards Berber would be no longer than from Suakin. As regards the probable cost of the line it is difficult to speak with accuracy, as no proper railway survey has yet been made. We have, however, a very carefully prepared survey of another proposed African railway, the construction of which is strongly urged for the development of Central Africa. It is that of the line from Mombasa to the Victoria Nyanza, passing through the territories of the Imperial East African Company. This railway would be 660 miles in length, and passes over two mountain ranges of 7,230ft. and 8,700ft. in height respectively.

The gauge proposed was 3ft. 6in., and the cost to put the line in working order, including all expenses, was estimated at £3,409 per mile, and a further sum of £2,000 to complete it as a permanent line. As the Suakin-Berber railway would be easier to make, and as Suakin is 3,000 miles nearer to England than Mombasa, perhaps £5,000 a mile might be taken as a fair estimate of the cost of the line under our consideration. I might mention, for the sake of comparison, that the cost of the railway recently made from Jaffa to Jerusalem, 54 miles in

length, and rising to a height of 2,450ft. above the sea level, is said to have cost from £6,000 to £7,000 a mile, and it passes through a much more difficult country than that from Suakin to Berber.

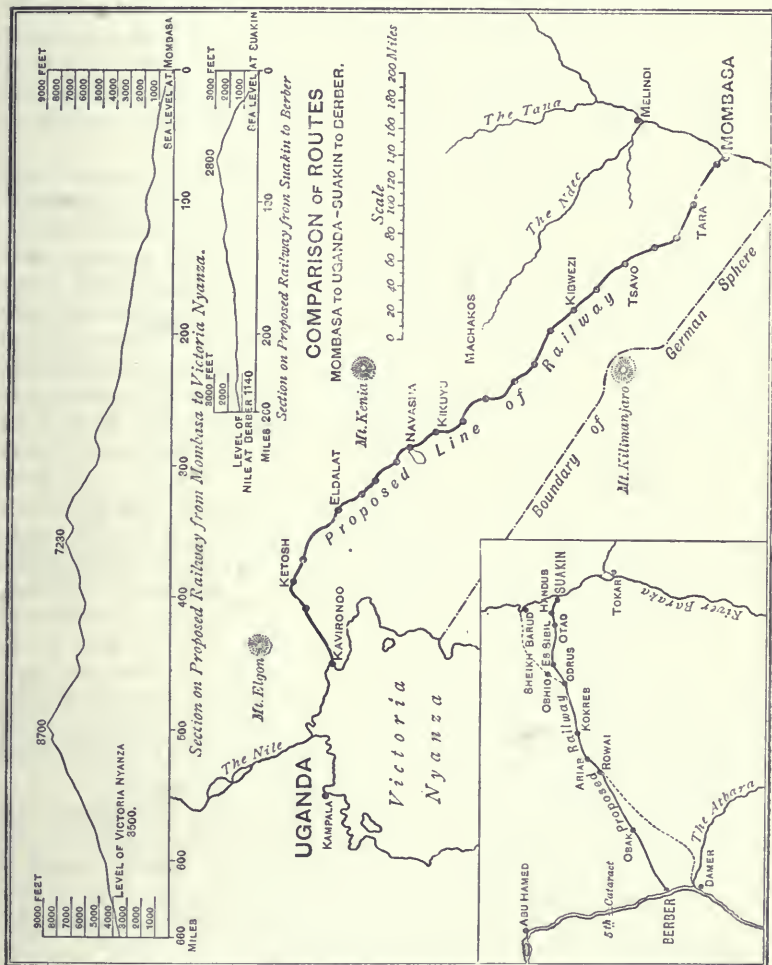


Diagram No. 4.

In order to show the relative natures of the ground to be passed over by the proposed railway from Mombasa to the Victoria Nyanza, and by that from Suakin to Berber, I have shown in Diagram No. 4 a plan and section of each of the two routes on the same scale, so that any one accustomed to

engineering questions can judge for himself as to the proportionate difficulties of making them. It should be remembered that it is the line from Mombasa to the Victoria Lake that has been so prominently brought forward of late, and which it is urged that the Government should cause to be made out of public funds. But, considering the relative cost, and also bearing in mind the fact that the Suakin line would open up a larger and more important district, I cannot help thinking that if national funds are applied to any one railway into Africa, the one selected for construction should be that from Suakin to Berber, and not that from Mombasa to Uganda.

The strongest argument against the construction of the Suakin-Berber Railway is the fact that the Sudan is at present in the power of the followers of the late Mahdi, and his successor, Abdullah el Towashi, is absolutely opposed to all progress and civilisation. It is, however, quite impossible that the present state of affairs can long continue, and however much some people may consider it more advisable to leave the inhabitants of the Sudan to settle their own affairs in their own way, it must be regarded as an absolute certainty that sooner or later this part of Africa also must come under the influence of one or other of the European nations. This, of course, would be of very great benefit to Egypt, which now has to spend a very large sum annually in keeping up a military force to guard its southern frontier from a possible attack from the Sudan. Were the latter under the influence of a civilised power this danger would cease, and the Egyptian military budget could be very much reduced.

If the present policy with regard to the Sudan is continued, we shall probably before long see the Nile valley in the hands of other nations. The Italians will move into it from the east, the Congo State from the south-west, and, most important, the French from the west, and thus, when it is too late, we will regret not having taken any steps to preserve this important country for English enterprise and English commerce.

Having thus shown that there is no difficulty whatever in constructing the railway, and having pointed out its importance for the development of the Sudan, I would like to quote a letter on the subject from the late General Gordon, who, when asked his opinion on the subject of the construction of a railway from Suakin to Berber, replied as follows:—

“Speaking from long experience in the Sudan, I feel convinced that, until such a communication is made, no real progress can be reckoned on in these countries. Their being so near Egypt proper, and yet so backward as they are, is simply owing to the great difficulty in getting to and from them to the Red Sea; a belt of arid sand of 200 miles separates them from civilisation, and till this is spanned no real progress can be made. The Khedive, Ismael Pasha, fully recognised this great

point, for, as His Highness often told me, he wished the railway made up the Nile simply for the facility he would then have of supervising the government of the Sudan, and, though the line up the Nile is wrongly chosen, yet he was right as to the importance of a regular communication from Egypt to the Sudan. There cannot be the least doubt but that the route, Suakin-Berber, is the true natural route to be opened.

"Had this route been opened when I was in the Sudan, it would have been infinitely more simple to have governed those countries. The hidden misery of peoples in the dark places of the Sudan exists because no light is thrown on those lands, which light this railway would give, and it is certain, when it is known that the railway is completed, an entire change will take place in the whole of this country.

"As long as the present state of affairs (with no communication) exists there will be revolts and misery, and this will entail many thousands per annum on the exchequer of Egypt, for it is certain that Egypt cannot throw off the Sudan and allow other countries to take it.

"Had I time I could say much more on the subject. I conclude by saying that the railway is a *sine quâ non* for the well-being of the Sudan.

"C. J. GORDON."

I would conclude by expressing the hope that it may not be long before the work he looked upon as so important is accomplished, and the Suakin-Berber Railway is a reality.

The Story of Björling and Kallstenius, Swedish Explorers in the Arctic. By Robert Stein, U.S. Geological Survey, Washington, D.C. The history of the Björling expedition was made adequately known only recently by Professor A. E. Nordenskiöld, the famous circumnavigator of Asia, in a lecture before the Society of Anthropology and Geography of Stockholm, December 15, 1893, and printed in the Society's periodical, *Ymer*. From this it appears that Björling's aims were far more ambitious than might have been inferred from the newspaper accounts. His plans are thus described in his application for the Vega stipend: "I intend to leave Stockholm in the beginning of May for St. John's, and thence to sail either with whaling steamer or in a hired vessel along the West Greenland coast past Cape York to some place on Ellesmere Land, as close as possible to Cape Sabine. Under ordinary circumstances I ought to arrive there about midsummer. During the two and a half months following I shall undertake a trip with sledge and boat along Ellesmere Land and through Hayes Sound, in the direction of Victoria archipelago or North Kent. That region, which is entirely unknown from a geographic point of view, presents an unusually rich field for botanical investigations, being the connecting link between Arctic North America and Greenland. As regards the return voyage, if it is to be made on a steam whaler, I shall have to meet one of those vessels at Cape Warrender on North Devon, in Lancaster Sound; if I go in a hired vessel I shall have to return to the point on Ellesmere Land where I left the vessel. As regards my chances of making this trip of 650 miles in seventy-five days, I may mention that in the summer of 1891, under very unfavourable circumstances, I made 400 miles in sixteen days, in the ice along the West Greenland coast. During my stay in Arctic North America I shall, of course, make as large collections of natural history objects as possible, and I

may point out that while Swedish expeditions have visited the whole polar region from West Greenland eastward to Bering Strait, not a single Swedish expedition has yet visited the North American archipelago. The return from the northern part of Baffin Bay is intended to be made in the beginning of September." Then came his last voyage. In the spring of 1892 he went to St. John's by way of Liverpool. Whereas in his first Greenland voyage he had been alone, he was now accompanied by a young zoologist, Evald Kallstenius, Björling himself being by profession a botanist. The means at his disposal, mostly private contributions, were very slender, but it was known that he had a knack of making the most out of small funds. Thus his first Greenland voyage cost in all not more than a round-trip ticket from Stockholm to New York. Arrived at St. John's he found that he was too late to take any whaling steamer. The sum at his disposal for the purchase or hire of a vessel was only \$600 to \$700. Finding no owner willing to hire out his vessel, he finally decided to purchase for \$650 the schooner *Ripple*, of thirty-seven tons. The vessel being generally regarded as unseaworthy, and the pay he offered being small, he found it almost impossible to get a crew. Finally he succeeded in securing a Danish helmsman, Karl Kann, as captain. According to a statement in a Canadian newspaper the rest of the crew consisted only of two men—an Englishman, Gilbert Dunn, a Manchester boy, acting as helmsman, and Herbert McDonald, from Prince Edward Island, as cook. According to a letter from Kallstenius, Godhavn was reached on July 28, and was left behind on August 3. Mr. Jørgensen, governor of the colony, states that Björling there purchased a shotgun and a rifle with the necessary ammunition, as well as some provisions, clothing, &c., and a good boat. He also carried good scientific instruments, in part loaned by scientific institutions of Stockholm. He also seems to have had a sufficient store of winter clothing, but his provisions were not sufficient for wintering. His last letter arrived more than a year ago. At last, on November 14, 1893, a telegram from Dundee brought the first news. About the middle of June last the watch in the crow's-nest of the whaler *Aurora*, Captain McKay, passing near the most south-easterly of the Cary Islands, discovered near that island an object looking like a wreck. A boat was immediately lowered and rowed over. The schooner *Ripple* was found lying on the shore, almost buried in ice. Not far away was found a pile of stones containing the body of a man. Near by was a large mound, probably the "cairn" left there by Nares. In this was found a tin can, containing four open letters written by Björling, and a sealed letter addressed to a person at St. John's. Although the vessel lay cast up on the shore, it was not possible to get into it, because the deck was covered with ice, in some places several feet thick. All round were found books, articles of clothing, &c., which were all packed in a box, obtained from the wreck. This box arrived in Stockholm, but contained nothing that could give additional light. The last and most detailed communication is written in pencil on a little sheet of letter paper. It reads thus: "As you will learn from my communications here deposited, I tried, after the loss of my vessel, to reach Foulke fiord, in order to winter there. But, after reaching Northumberland Island, I was obliged by several circumstances to return to the Cary Islands. Having been obliged by bad weather to spend some time on this island, I am now starting to meet the Eskimos at Clarence Head or Cape Faraday on Ellesmere Land. In the hope that a whaler will next year visit Cary Islands to relieve me and my men, I shall try to reach those islands before the first of July. If no whaler appears before the 15th of July I shall be obliged, if possible, to go to the Danish colonies. Hence, if you visit this island later than July 1 and do not find any information regarding my departure for the Danish colonies, I shall be greatly obliged to you if you will go to Clarence Head (fifty miles from here), where I will erect a 'cairn' on the easternmost point, and in it deposit information regarding the fortunes of myself and my men during the winter. Finally, I request that you send all information concerning myself to Professor Nordenskiöld in Stockholm, or to the nearest Swedish consul, together with a statement as to time when and place where it was found. Unless I reach the Eskimos our provisions will not last longer than the first of January, supposing that I do not succeed in increasing them from some depot of provisions. We are now five men, one of whom is dying." The letter is dated October 12, 1892. Captain McKay at once headed for Ellesmere Land, but the ice prevented his approach in the limited time at his disposal. No further news has been received.—*Ny illustrerad Tidning*, No. 47

THE ENGLISH POLAR EXPEDITION.

The screw steamer *Windward* started on Wednesday, July 11, under the favourable auspices of acquired knowledge and careful preparation, on one of those Arctic adventures which have brought this country so much glory, and, unhappily, so much sorrow. In the case, however, of the Jackson-Harmsworth expedition, good hopes may reasonably be entertained for the safe return of the eight brave men who are going in quest of the North Pole, and of great accessions to our knowledge of those inhospitable regions. Careful choice has been made by Mr. Jackson of his comrades, who are all tried men, each possessing some special qualification for the task. Mr. Jackson is a modern Ulysses, to whom scarcely any region of the earth is unfamiliar, and he has special acquaintance with the conditions of Arctic exploration. His companions are : Mr. Albert Armitage, a second officer of the P. and O. Company and a skilled astronomical observer ; Dr. Kettlitz, who will care for the health of his colleagues ; Captain Schlosshauer, of the mercantile marine ; Mr. Fisher, Curator of the Nottingham Museum ; Mr. Burgess, who undertakes the grave responsibility of the commissariat and is by no means a novice in Arctic travel ; Mr. Childs, who will be the photographer and mineralogist of the party ; and Mr. Dunsford, a master of the theodolite and an expert sportsman. The expedition is distinguished from many of its predecessors in being for the most part a land exploration party, and it is confidently anticipated that, if the Pole itself should again prove unattainable, a point may be reached far north of the 83 20—the limit of Admiral Markham and Admiral Sir G. Nares—and the 83 24 of Lockwood in Greely's expedition. The sea party is 22 in number, three of whom, however, Professor Boulger, Mr. Herbert Ward, and Mr. A. Montefiore, only go as far as Archangel. The starting point for the really severe labours of the expedition will be the southern coast of Franz Josef Land, which it is expected will be reached about the 23rd of August. The Austrian traveller Payer has made valuable contributions to our knowledge of that dim country, and especially of its atmospheric conditions. But unforeseen contingencies have been provided against, and in view of possible mountain ranges a full Alpine equipment has been prepared. According to Mr. Leigh Smith, who visited Franz Josef Land a few years ago, game and fish, Polar bears, and seals exist in abundance, and an ample supply of fresh food may thus be obtained. For this purpose ordinary rifles, shot guns, harpoons, fishing tackle, and other apparatus have been supplied in abundance. But in the event of no such variety of diet being obtainable, provisions are being taken sufficient to last four years on full rations and seven years on half-rations. Nor have the provident furnishers lost sight of the abnormal appetite which intense cold excites. Lighting, cooking, and warmth will be obtained from a stock of methylated spirit, 60 over proof, which will defy any declension of temperature, and in the burning of which such arrangements will be made as to defy the strongest gales. Brandy also of great strength is taken, and several cases of port, which Mr. Jackson and many medical authorities consider to possess valuable anti-scorbutic properties. That scourge of previous expeditions, scurvy, will thus, it is thought, be made impossible. Another item of solace, if not of necessity, is supplied by a good stock of thoroughly desiccated tobacco, of which each man will be allowed one pound a month. After landing in Franz Josef Land, at some safe point which can be reached without excessive danger from ice, the *Windward* will come home, and return in the summer of 1896. The party will land, and hope by successive stages to advance inland 600 or 700 miles. The several depôts will be gradually settled upon, and the line of communication made secure. The expedition has been equipped with an aluminium

boat 18ft. by 5ft., provided with collapsible canvas gunwales, and divisible into three sections, in the construction of each of which great ingenuity has been exercised. Each section will float by itself, and when joined together the craft will carry from 13 to 20 persons. The boat, which altogether weighs 150lb.—far less than a craft of any other material—will be carried on sledges, and used for crossing open waters. There is also a copper boat, built on exactly the same lines and weighing 198lb., and three Norwegian boats which can be used as sledges. Eighteen sledges, combining extraordinary strength and lightness, will also be employed. Each sledge is capable of carrying 1,000lb. The sledges will be drawn by Siberian dogs, a pack of which is in readiness for the expedition at Archangel, and by Siberian ponies, tough, hardy animals, which are naturally fitted for rough Arctic work. The canteen arrangements are of a complete and ingenious character. Mr. Jackson has designed a canteen which weighs only 5lb., yet contains a large number of ingenious appliances. The explorers are also equipped with a set of meteorological, astronomical, and other scientific instruments of the finest manufacture and the greatest precision. For sleeping purposes Mr. Jackson has had constructed for the expedition three collapsible tents, weighing 30lb. each, capable of giving accommodation to six men. The *Windward* herself is a barque-rigged screw steamship of 400 tons yacht measurement. Mr. Harmsworth's alterations have made her perhaps the strongest vessel of her size in the world. In some parts she has four distinct skins; her bow is sheathed with hardened steel plates. What strikes the uninitiated is the crow's-nest at the top of the mainmast. Here Mr. Crowther, the ice master will take his station when the vessel enters the ice. The crew are housed in the forecabin, which has been enlarged and improved for their comfort, while the officers will occupy quarters amidships. The Duke of York, who was especially desirous to examine the ship, has written to Mr. Jackson a hearty letter, in which he "wishes the expedition every success, and the members of it a safe return." Mr. Markham, President of the Royal Geographical Society, has also written warmly to Mr. Jackson. It is thought that the expedition will last for about three years, and that its total cost will be about £25,000.—*The Times Weekly Edition*, July, 13, 1894.

A CONTINENTAL—NOT A CHANNEL—ISLAND.

A WEEK'S WINTER IN ST. HELIERS, JERSEY, JANUARY, 1894.

| Date.
Jan. | (Air.)
Barometer. | (Air.)
Ther. | (Sea.)
Specific Gravity. | (Sea)
Thermom. | Snow.
Rain. | Wind. |
|---------------|----------------------|-----------------|-----------------------------|-------------------|----------------|--------|
| 3. | 30.52 | 27 | 1026 | 41 | S. | N.E. |
| 4. | 30.28 | 23 | 1024 | 41 | S. | N.E.E. |
| 5. | 29.92 | 20 | 1023 | 39 | S. | E.S.E. |
| 6. | 29.73 | 24 | 1025 | 41 | S. | E.S. |
| 7. | 29.96 | 29 | 1029 | 42. | S. | E. |
| 8. | 30.08 | 31 | 1029 | 42.5 | R. | S.E.S. |
| 9. | 29.85 | 39 | 1025 | 42.5 | R. | S. |

An Atlantic cyclone prevailed on 7th and 8th, and drove sea up channel, and made sea thermometer rise, and specific gravity also.

Guide-Book Climates fictitious—sunniest place in Britain a fraud—cloud 10 every morning.

Thermometer down to 15° at Roman Catholic College.

W. J. BLACK, F.R.C.S.E., F.R.M.S

Edinburgh, May, 1894.

REPORT OF THE SECRETARY TO THE COUNCIL OF
THE MANCHESTER GEOGRAPHICAL SOCIETY, FOR
THE YEAR 1893.

It is a pleasure to report to you the proceedings of the Society for the year 1893.

The year has been one of considerable activity, of interest, and of good work.

The objects for which the Society was founded in 1885 have been steadily kept in view, and some progress has been made.

MEETINGS.

In addition to about sixty addressed by the "Victorians" forty-six meetings of the Society have been held in various places, where addresses of great value have been delivered, and papers of considerable interest have been read. The scope of the Society's work is beginning to be better understood.

ADDRESSES.

The addresses given to the Society have been largely illustrated by the use of the lantern, when original slides, by the lecturers or others, have generally been used. Maps, charts, photographs, pictures, native products from the countries described, and manufactures, articles of trade or barter, and natural or artificial curiosities have been very freely exhibited.

The addresses given have been of a high quality, and whilst Scientific Geography has not been neglected, Commercial Geography has had full illustration and discussion. It was a pleasure to find the meetings well attended by the members (except on a very inclement evening). Not only has the number of members present been considerable and well sustained, but the attention of those present and their interest has been good, more members than formerly being ready and anxious to question and to discuss the subjects brought before them.

It has not been at all surprising, in this connection, to find that a large number of the members are personally acquainted with distant countries; but it has often been a surprise to those who have been addressing the Society.

A list of the addresses and papers given will show the ground covered during the year in the various meetings of

the Society. But to the members who are not able to be present at the Library meetings it may be of interest to know that at those meetings, beside the papers, &c., referred to below, a large number of smaller papers, letters from Foreign Societies, communications from Societies and members abroad, examination of geographical questions as they arise, and of books, maps, plans, photographs, pictures, and other matters which are being every day added to the Library treasures are examined or read; making these smaller meetings perhaps the most valuable and interesting of the series, and it is quite impossible to report all the work done in this way (often most informally). The following is a list of the more important papers which have been delivered or read to the Society during the year:—

EUROPE.

The Lower Loire. Mr. E. W. Mellor, J.P., F.R.G.S.
 The Ancient Canal at Perekop. Mr. N. Melikoff (Odessa).
 A Yorkshire Valley (Wensleydale). Mr. W. Hamer.
 Dale Abbey and the Ancient Parish Church (Derbyshire). The Secretary.
 Hale Hall and Speke Hall, and Notes on Various Halls in Yorkshire, Lancashire, and Cheshire. The Secretary.

ASIA.

Palestine. The Rev. Canon Franklin (Newcastle-on-Tyne).
 Trade Routes through the Himalayas. Mr. Clements R. Markham (President of the Royal Geographical Society).
 Siam and Tonquin. The Right Hon. Lord Lamington.
 The Pamirs. The Right Hon. the Earl of Dunmore.
 The River Valleys of the Himalayas. Mr. R. D. Oldham, F.G.S. (Superintendent of the Geological Survey of India).

AFRICA.

Europe in Africa. Mr. E. G. Ravenstein, F.R.G.S.
 The Condition of Suakin and District. Mr. A. B. Wyld.
 Native Wars in Portuguese South-West Africa. Mr. R. E. Dennett.
 The Yoruba Country. Rev. J. T. F. Halligey, F.R.G.S.
 Travel and Sport in South Africa. Mr. F. C. Selous.
 A Flotilla and Trading Company on the Zambesi and Shiré Rivers. Mr. G. E. T. Smithson, F.R.G.S. (Secretary Tyneside Geographical Society).
 A Year's Exploration in Egypt. Miss Barlow.
 The Hausa (the Robinson Scholarship). Major Darwin, M.P., Sir Taubman Goldie, Rev. C. H. Robinson, and others.
 Machakos. Mr. John Ainsworth.
 Matabele and Mashona-lands: a retrospect. Mr. T. Dentith.

AMERICA.

British Honduras: its Present State, Needs, and Prospects. H.E. Sir A. Maloney (Governor of Honduras).
 Mexico: Notes of a Recent Visit. Mr. Wm. Thomson, F.R.S.E., &c.

AUSTRALASIA.

The Progress of New Zealand. Mr. F. Hatch.
 The Floods at Brisbane. Mr. C. L. Wragge, F.R.G.S., &c.

ARCTIC AND ANTARCTIC.

Nansen's Proposed Voyage.

Peary's Last and Next Journey.

Mr. Jackson's Proposals.

The Dundee Whalers in the Southern Ocean, and Other Projected Voyages. The Secretary, Mr. J. Howard Reed, Mr. G. H. Warren.

EDUCATIONAL.

Geography in Schools. Mr. E. G. Ravenstein, F.R.G.S.

The Higher Education of the Negroes. Rev. J. E. Roy, D.D.

GENERAL.

Hints on Reconnaissance Mapping in Unsurveyed Countries.

Project for Meteorological Observatories in the Atlantic. H.H. Prince Albert of Monaco.

Protective Resemblance and Mimicry in Nature. Col. C. Swinhoe, M.A., F.L.S.
Vestiges of Village Communities, with especial reference to Withington, Rusholme, and Burnage. Mr. H. T. Crofton.

A number of these valuable contributions are reprinted in the *Journal*. It is a matter of regret that space will not allow all the contributions to be printed in full.

DISCUSSION OF PAPERS.

During the year the members have in increasing numbers availed themselves of the opportunities offered them to discuss a good many of the addresses and papers at the meetings. This we hope will become more largely the practice, as it makes the meetings more interesting, and is often the means of valuable information being given.

EXCURSIONS.

A large number of members have availed themselves during the year of the opportunities afforded them of becoming better acquainted with their own country through the excursions organised by the officers of the Society; and it is a great pleasure to be able to say that in every case where application has been made for permission to visit halls, parks, or valuable artistic collections, the Society has been courteously received, and in most cases we have been informed that another visit would be welcomed.

PRACTICAL GEOGRAPHY AT HOME AND ABROAD.

Attention has been called in these visits to the geology, botany, and natural history of the districts visited—to the geographical features, the history, products and industries, and to the curious, and in some cases complex, variations of industries and commerce. The antiquary and the artist have been

often surprised to find how very valuable are the rich collections to be found in the three counties, and how the knowledge of these remains of an older order fills out and completes the significance of historical knowledge, which without this would be lean and uninteresting.

In foreign travel, again, surprise has often been expressed at the lessons to be learned by stay-at-home people, and at how much of that which seemed to be our own has had origin and fruition in foreign lands.

ASSISTANCE TO MEMBERS.

A large number of the members who have gone abroad with parties or alone have been greatly assisted by information and introduction, and they have always been assisted and kindly received by those in France, Germany, Belgium, Russia, Italy, Egypt, Australia, and America (North and South), to whom letters of introduction have been given.

INTERNATIONAL LETTERS OF INTRODUCTION.

It will be a matter for consideration to be brought before the International Congress, to be held in London in 1895, if an official, international letter cannot be given to travelling members of all geographical societies, which should entitle them, on presentation to any secretary of a geographical society in any city visited by them, to receive any information, or assistance, or direction necessary to them. This would be a means of making known to each other the most active members of all societies who are interested in the various phases of geographical enquiry and research.

The wide field covered by the members in the year 1893, including Belgium, Italy, Switzerland, the United States, and some of our Colonies, is manifest by the enumeration of the places visited, the numbers on each occasion varying from 12 to 200. About 700 members have taken part in them this year.

Besides foreign excursions, the following visits have been made by the members:—

Chetham College and Library.
The Bridgewater Canal to Runcorn.
Prestwich and Mere Cloughs.
Carrington Moss.
Whitworth Park.
The Meteorological Observatory, Whitworth Park
The Exhibition of Water-colour Drawings at Whitworth Park
The Ship Canal : Several visits to different sections.
The Manchester Waterworks, Woodhead.
Crowden.
Hollingworth.
Tintwistle.
Mottram.

Stalybridge.
 Dunham Hall, Park, and Church.
 Blackburn and Rividge Park.
 Hoghton Tower.
 Bolton-le-Moore.
 Hall-i'th'-Wood (twice).
 Eagley.
 Turton Tower.
 Dunscair.
 Smithells Hall.
 Hale and Hale Hall.
 Hale Park and Gardens and Decoy.
 Speke Hall and Hale Hut.
 Southport and Botanic Gardens.
 Delamere, Oak Mere, and Cuddington.
 The City of Chester and The Museum.
 Millers Dale and Tidesdale.
 The Marple Woods and the Etherow Valley.
 Capesthorpe Gardens and Hall.
 Capesthorpe Park and Alderley Edge.
 Greenfield Moors, Bills-o-Jacks, and Dobcross (the Greenfield and Chew Valleys).
 Leeds, The Picture Gallery and Red House.
 Temple Newsam and Whitkirk.
 Nottingham and Neighbourhood.
 Dale Abbey, the Old Church, and Caves.
 Ripon, Town Hall and Cathedral.
 Studley Royal, Park, and Fountains Abbey.
 Kent, Surrey and Sussex, Head Quarters at Hawkhurst.
 Plymouth and Dartmoor.

These excursions cannot have been made without adding to the knowledge of the members, and have invariably been much enjoyed. A large number of photographs have been taken at the various places visited by one or other member of the "Victorians." A short account of these several journeys has appeared in the Proceedings of the Society, illustrated with views where it has been possible.

JOURNAL.

The numbers of the *Journal* for January to June, 1892, and January to June, 1893, were published in the year 1893. The volume for 1892 is now complete, and all the proceedings for 1893 are now issued.

We hope to be able to bring the *Journals* up to date by the end of 1894, although it will be very difficult.

There are a few copies of Volumes 2, 3, 6, 7, 8 in stock, which we should be glad if the members would obtain on the terms fixed by the Council. The volumes will not be reprinted, and Volumes 1, 4, 5 are out of print.

The demand from abroad for the *Journals* is more than the Society can supply. If we could afford to have 50 volumes of each issue put by for distribution as requested by Societies it would be well, but that is at present out of the question. When a new foreign corresponding society therefore joins us, and

graciously sends a set of the volumes of their bulletins or journals, we can now only send them in return broken sets of our *Journal*.

But this cannot be helped; we are not able in this direction to do more than we are now doing, however great the pressure may be or our desire to do otherwise. We are not ashamed of our *Journal*, and we note with pleasure that several features, and even the general get-up of the book, have been copied by other societies.

If our funds would allow, and we could have a supply of illustrations and maps, we should have a journal to be proud of. For this we must wait.

In the meantime the Society is under obligation to publishers and others for the loan of some blocks, to those who have carefully read and corrected the papers, to the "Victorians" for their work in analysing the journals received by us, giving a view every year of the principal papers issued in the journals of the greater part of the geographical societies of the world, and really forming an important basis for an international view of the year's geographical work.

CORRESPONDENCE AND OFFICIAL REPORTS.

The Society has been highly favoured during the year by receiving communications from the officials of a considerable number of corresponding societies; from many distant places we have had letters, and the Society has by these means had very important information at their disposal. In this connection we should not forget the obligation we are under for letters from missionaries, traders, officers and from corresponding members, who are glad to send to us communications on events and geographical and commercial matters in their respective districts. This is a growing and important department of the Society's work; and if the information so obtained is cautiously used, will be of great value to the great commercial interests of the district.

THE LIBRARY, MAPS, PHOTOGRAPHS, PICTURES, LANTERN SLIDES.

Journal, Vol. VIII., 7 to 12, 1892, contains a list of additions to the Library, and this list (with the analysis) fills fifty-two pages. These additions consist of maps, journals, bulletins, comptes rendus, proceedings, reports, transactions, papers (illustrated with maps, pictures, and photographs), maps, drawings, atlases, photographs, lantern slides, diagrams, curiosities, and specimens of natural products.

The number coming to the Library daily is almost overwhelming, and only those members (and they are increasing in

number) who spend some time in the Library can have any idea of the valuable collection gathered, by painful effort, in the last ten years of the Society's existence.

AFFILIATED SOCIETIES.

The example of the Burnley Literary and Scientific Club, in becoming an affiliated Society and forming at Burnley a local centre for the promotion of Geographical work, has been followed by the Free Libraries Committees of the Corporations of Oldham, Salford, and Manchester; the Carlile Institute, Meltham; the Saddleworth United Mutual Improvement Society, and the Eccles Provident Industrial Co-operative Society. In addition, the following gentlemen have been appointed local honorary secretaries in

| | |
|-------------------------------|---------------------|
| Oldham | Mr. F. Rigg. |
| Lytham | Mr. Lightwood. |
| Blackpool and St. Annes | Mr. R. Cowell. |
| Heywood | Mr. G. Fairbrother. |
| Leigh, Tyldesley, &c. | Mr. J. Ward, B.A. |
| Stockport | Mr. T. H. Rathbone. |
| Urmston, Flixton, &c. | Miss A. E. Law. |
| Leeds | Miss J. E. Curzon. |
| Bradford | Mr. ——— |
| York | Mr. Willoughby. |

This is an important and may be made a far-reaching department. It opens the way to a great enlargement of the Society's operations, and will probably lead to the establishment of branches throughout Lancashire, Yorkshire, and Cheshire, which might then be consolidated into a Geographical Institute, which could much more effectually compel attention to the proper teaching of the subject in the schools of the district.

SCHOOLS.

Examination of the schools in their methods of teaching, and in the appliances for teaching, have gone on during the year by the Society's inspector, and the view taken last year has been confirmed, viz.: "In a good many primary schools Geography is *taught*. The appliances are often poor in quality and meagre in quantity.

MEMBERS.

The number of members remains about the same, but the heavy death-rate makes it a continual task to fill up the void of their absence, and of the constant loss by resignation, removal, &c.

DEATHS.

We regret to find amongst a large number of deaths in 1893 the following members, several of whom were particularly friendly and serviceable to the Society:—

The Right Hon. the Earl of Derby, K.G.
 Wm. Armitage, Esq., J.P.
 Samuel Barlow, Esq., J.P., Mayor of Middleton.
 Mr. W. A. Child.
 Mr. W. J. Clark.
 Councillor Albert Fletcher.
 Mr. Frank Moritz.
 Mr. John Gregory.
 Mr. J. F. Hague.
 Mr. J. M. Haarbleicher.
 Mr. J. McLoughlin.
 Mr. Henry Whiley.
 James Jardine, Esq., J.P., a member of the Council and trustee.

It is sad to see the death-roll and to feel how desolate the departure of warm friends leaves those who are left. It remains for the members to take care that new recruits are found who shall more than fill the places of those who have laboured some time with us.

EXAMINATION IN GEOGRAPHY, 1894.

There has been no examination in Geography in 1893, but one has been held in 1894, on "Yorkshire," and the Examiner's and Secretary's reports are appended hereto.

That examination and the reports speak for themselves, and, without more words, point to the need of better teaching of the subject in the schools.

The next examination is intended to be held by the Society in 1896.

"VICTORIANS."

The work of the "Victorians" has been of a most interesting nature, and has excited considerable interest. The work is reported on by the honorary secretary, Mr. J. Howard Reed, and that report is added to this one, and tells its own tale of work freely GIVEN, which has been most successful.

BALANCE SHEET.

The balance sheet and the auditors' certificate are also appended, and through the valuable and persistent work of S. Oppenheim, Esq., the treasurer, a good report is rendered of the Society's finance. The list is being cleared of members in arrear with their subscriptions; the debts of the Society are being reduced and will be soon removed.

FUTURE WORK.

The future work of the Society is full of promise. There is still urgent need for the work done by the Society, but to enable full effort to be given to the force already in hand, there are several important and pressing needs. The first is, undoubtedly, proper and convenient accommodation for the meetings, and for the Library and Museum of the Society.

There is a want of a large room, where products of the Colonies sent from the Imperial Institute can be exhibited, and accommodation for the other departments of the Society's work can be found. This want will not allow of delay, and we trust the members will make this a personal matter and help the Council to solve the difficulty.

There is one way very easy to accomplish this if the members will take the matter into their own hands. If every member would next year only obtain half a new member, the Council would be justified in obtaining the accommodation vital to the further progress and the successful carrying on of the work of the Society.

GEOGRAPHY AT OWENS COLLEGE.

In closing this report, it is needful to refer to the lectureship of Geography at Owens College. The account of the fund to meet its cost and that of the examinations is to be found in the balance sheet. Owing to the death of some of the subscribers it will be necessary to solicit subscriptions from others. This work cannot be allowed to stop. It is feeding the stream at the fountain-head, and it is only required to remind the members that to meet the expenses of the Education Department for another three years we shall require £300, about £150 of which has already been secured.

We regret the removal of the first lecturer (Mr. H. Yule, Oldham, M.A., F.R.G.S.) to Cambridge, and wish him every success in his new sphere.

The Council are grateful to the Royal Geographical Society, who have generously helped the Society with an equal contribution for the three years, and to the Owens College for their sympathy and assistance.

REVENUE ACCOUNT.

JANUARY 1st, to DECEMBER 31st, 1893.

Dr.

Cr.

| EXPENDITURE. | | INCOME. | |
|---|-------------------|----------------------------|-------------------|
| £ | s. d. | £ | s. d. |
| To Expenses of Meetings | 140 9 8 | By Members' Subscriptions— | |
| " <i>Journal</i> , January, 1892, to June, 1893..... | 157 3 4 | Life | 10 10 0 |
| " Secretary's Salary | 100 0 0 | Ordinary..... | 526 11 6 |
| " Rent, Rates, Gas, &c. | 50 17 3 | Associate | 95 11 0 |
| " Books, Maps, Binding, &c., for Library | 6 5 9 | Affiliated Societies..... | 8 8 0 |
| " Sundry Expenses—Stationery, Postage, Telegrams, Carriage, Wages, Coal, &c. | 75 5 1 | Bank Interest..... | 641 0 6 |
| " Commission and Expenses for New Members and Collection of Subscriptions | 34 11 6 | | 0 19 4 |
| " Arrears of Subscription (written off)..... | 109 16 7 | | |
| " Geographical Examinations— | 69 6 0 | | |
| Expenses for 1894 Examination | 5 13 9 | | |
| " Balance, as per General Balance Sheet..... | 2 7 6 | | |
| | <u>£641 19 10</u> | | <u>£641 19 10</u> |

THE TREASURER IN ACCOUNT WITH THE

VICTORIA UNIVERSITY GEOGRAPHICAL LECTURES FUND.

Dr.

Cr.

| £ | s. d. | £ | s. d. |
|---|----------------|--|----------------|
| 1893. | | Dec. 31. | |
| Jan. 1. To Balance of Cash in hand..... | 55 12 10 | By Cash Paid as Guaranteed for the year 1892 3.. | 50 0 0 |
| Dec. 31. " Donations Received— | | " " Balance of Cash in hand | 26 7 0 |
| Dr. Ward, Owens College | 10 0 0 | | |
| Mr. S. Ogden, J. P. | 5 0 0 | | |
| Prof. W. Boyd Dawkins..... | 3 3 0 | | |
| As-amb..... | 2 0 0 | | |
| " " Bank Interest | 20 3 0 | | |
| | <u>0 11 2</u> | | |
| | <u>£76 7 0</u> | | <u>£76 7 0</u> |

N.B.—The sum of £50 per annum has been guaranteed for three years. Towards this there are donations promised amounting to about £5, which, with the balance in hand as shown above will leave a further sum of £20 to be provided early in the year 1894.

GENERAL BALANCE SHEET, DECEMBER 31st, 1893.

| ASSETS. | | | LIABILITIES. | | |
|---|------------|------------------|--|-----|------------------|
| £ | s. | d. | £ | s. | d. |
| By Arrears of Members' Subscriptions | 198 | 19 6 | To Nineteen Life Membership Subscriptions in Reserve ... | 199 | 10 0 |
| " Stock of Journals | 73 | 0 0 | " Subscriptions Paid in Advance | 85 | 14 0 |
| " Lantern and Slides Account— | | | " Geographical Lectureship Fund | 26 | 7 0 |
| Balance from 1892..... | 16 | 17 0 | " Sundry Accounts Outstanding | 98 | 4 4 |
| Further Expenditure | 8 | 18 9 | | | |
| | <u>£25</u> | <u>15 9</u> | | | |
| Less received from the "Victorians" ... | 16 | 0 0 | | | |
| | | <u>9 15 9</u> | | | |
| " Amounts Charged on Account of 1894— | | | | | |
| For New Members | | 5 0 0 | | | |
| " Amounts Owing for Advertisements | | 6 0 0 | | | |
| " Cash in Hand, General Account— | | | | | |
| In Treasurer's Hands | 16 | 1 5 | | | |
| " Secretary's " | 2 | 8 7 | | | |
| | | <u>18 10 0</u> | | | |
| " Cash in Bank, Lectureship Account..... | | 26 7 0 | | | |
| | | <u>337 12 3</u> | | | |
| " Total | | | | | |
| Balance of Deficiency from 1892 | 24 | 10 7 | | | |
| Less Balance of Revenue Account, 1893 | 2 | 7 6 | | | |
| | | <u>22 3 1</u> | | | |
| | | <u>£359 15 4</u> | | | <u>£359 15 4</u> |

Audited and found correct, this 11th day of May, 1894.

THEODORE GREGORY, F.C.A., } HON.
 WILLIAM ALDRED, F.C.A. } AUDITORS.

REPORT OF THE "VICTORIANS," 1893-94.

THE "Victorians" have pleasure in reporting that the work undertaken by them has been carried through during the winter with increasing success, and also, they trust to the satisfaction of the Society as a whole.

The lecturing work of the past season has increased very considerably on former years. No less than sixty-two "Victorian" lectures have been given during the season, as against thirty-eight the previous year, being an increase of twenty-four meetings. Ten of these were arranged on behalf of the Working-men's Clubs' Association, and included meetings at Haslingden, Mossley, Radcliffe, Oldham, Reddish, Preston, and Newton Heath, all except two being illustrated with lantern views.

The Free Libraries of Oldham and Salford, and other associations at Saddleworth, Burnley, Leigh, and Meltham, all affiliated with this Society, have held fifteen meetings which have been addressed by our lecturers, lantern views being used on most occasions. It is pleasing to know that the list of affiliated Societies is extending each session; the "Victorians" claim to be largely instrumental in this development.

At the request of our member, Mr. Edward Milner, J.P., a series of five geographical lectures was given to the students of the evening-classes of Messrs. Brunner, Mond & Co., of Winnington, Northwich. The subjects chosen were: "General Geography," "The Shaping of the Earth's Surface by Water Action," "The Commercial Products of Central Africa," "Polar Exploration," and "British Expansion in South Africa." Three of the lectures were illustrated with lantern slides, for which the Society's lantern was used. The whole of these meetings were a great success, being attended by a large number of students, who displayed great interest and intelligent pleasure in the course. The "Victorians" are also pleased to know that the authorities themselves were more than satisfied with the work done. Mr. Edward Milner writes: "Will you kindly convey to your Society the best thanks of our managers for their kindness. . . . We cannot adequately thank those members who took so much trouble in preparing and delivering the lectures. I am sure those who attended will agree with me that they were most interesting, and conveyed to the boys a large amount of instruction in a most agreeable form." Such testimony, coming as it does from a director of Messrs. Brunner Mond's firm, is very gratifying. The Head-master, Mr. H. Caress, also writes: "The lectures have been highly appreciated and well attended, and we trust we may have the pleasure of seeing you again another session."

Two similar lectures were also given on behalf of the St. Andrew's Technical Classes, Eccles, at the request of our member, Dr. J. J. Cox. The subjects chosen were: "The Congo: its Discovery and Exploration," and "Polar Exploration," both lectures being illustrated with lantern slides. The Vicar of St. Andrew's, Eccles, the Rev. H. J. Armstrong, M.A., and the Mayor of Eccles respectively presided at the meetings, which were very numerous attended.

The "Victorians" are persuaded that such meetings as those above mentioned have a very valuable educational influence, and they look forward to considerable developments in this direction. They trust other educational institutions, such as commercial and other evening schools, will demand their services in the future, and would respectfully suggest to the Council that some steps might be taken to induce the collegiate authorities to utilise their "Victorian" lecturers for University extension work.

The remaining thirty meetings have been held at the request of various individual members of the Society, and on their behalf geographical lectures have been given at Freckleton, St. Annes-on-Sea, Poulton-le-Fylde, Tyldesley, Monton, Dobcross, Gorton,

Levenshulme, Didsbury, Crumpsall, and in various parts of Manchester itself. These meetings have been held in connection with literary societies, political and social clubs, and various charitable organisations in which our members are interested.

Twenty-four in all of the lectures given have been illustrated by means of lantern slides, the lantern apparatus and screen of the Society being used on nineteen of these occasions. The other eighteen lectures have been illustrated by maps and diagrams, either lent by the Society or by the "Victorians" themselves, who have previously prepared them.

The attendance at the meetings has varied from thirty to one thousand people, according to local circumstances. In all cases the gatherings have been thoroughly successful and many times enthusiastic. Many of the meetings have been well reported in the local newspapers, and numerous flattering letters of thanks have been received from the local organisers :—

"We were all greatly pleased and informed by the 'Victorian' lecture. . . . Many thanks to you and your admirable Society," writes one rev. gentleman. Another gentleman says: "I can only say, on behalf of our committee and myself, that we were exceedingly fortunate to have such an instructive and well-illustrated lecture on 'Stanley's Journey Across Africa' presented to us. There was a general agreement of opinion that it conveyed valuable information and entertainment. . . . Pray accept our best thanks to you and your colleagues, and the Manchester Geographical Society." Many similar complimentary expressions might be quoted.

In addition to those meetings already mentioned, the Society's lantern has been used on four other occasions for lectures, arranged for and given by others than "Victorians." Two of these were for Volunteer meetings addressed by Mr. H. T. Crook, member of our Council; one for the "Healthy Homes Society"; and the fourth at the request of a member. "Victorian" lanternists attended on each occasion. The usual fees named in our circulars have been charged for these services.

The "Victorians" are proud of the work that has been done, and look forward to even greater things in this direction in the future. They would very gratefully thank the Chairman of Council, the Hon. Secretaries, and Mr. E. W. Mellor, J.P., for the kind assistance they have rendered on the platform; and would further specially thank the Secretary for his able leadership and valuable help. They feel that the success of their efforts is almost wholly due to the enthusiastic and whole-hearted devotion of his talents to the work which he himself initiated and has since pursued with such unflagging zeal.

The "Victorians" trust that in the coming winter the demands upon their energies may be increased still more. Several gentlemen, members of the Council and others, of known ability on the platform, have very kindly promised to aid in lecturing work. It is to be hoped that suitable opportunities may arise to take advantage of their offers. It rests with the members to demand their services, and by so doing to increase the influence of the Society and the usefulness of the "Victorian" branch.

The usual small fees and travelling expenses have been charged for each of the meetings held (except those given for purely charitable purposes), including the Society's own meetings when the lantern has been used. From the funds thus raised have been paid all expenses, such as upkeep of lantern, additional lantern apparatus, including a long distance lens (this permits of our lantern being worked from the back gallery of the Memorial Hall) and a new lime-burner, hire of lantern slides, purchase of gas, carriage of lantern apparatus, travelling expenses, postages, &c. At the end of the year 1893 the "Victorians" were able to hand over to the Treasurer of the Society some £16 as a contribution to the Society's general funds. It should be remembered, however, that in return for this the "Victorians," and those whom

they serve, are indebted to the Society for the continual addition of new slides, which are procured as the demand for them occurs, as well as for maps and other apparatus.

On the evening of Friday, December 29th, 1893, a new departure was taken in the work of the Manchester Geographical Society. This consisted of a lecture to young people, the children (over twelve years of age), and friends of members, which was given in the History Theatre of Owens College, by permission of the Principal, Dr. Ward. The lecture, which was well attended, was given by the Hon. Secretary to the "Victorians" and was entitled, "From England to Japan." The address was well illustrated by numerous lantern views, and has already been briefly reported in the "Proceedings" in the Journal of the Society.

The usual Christmas gathering for the younger children of the members was held on the following evening, the last Saturday of 1893, in the Cotton Waste Exchange. There was again a good muster of the little folks, quite equal to the average, and they appeared to enjoy themselves to the full. Thanks are again tendered to those of our members who kindly assisted in the provision of the Christmas cake, buns, sweets, oranges, &c., with which the small people were regaled; as also to those ladies who so devotedly attended to the cutting-up and distribution of the same.

Various games and lantern shows formed part of the evening's entertainment. A very enjoyable feature was a very ably-conducted amateur conjuring entertainment given by Mr. G. A. Irlam. His clever tricks created much discussion among the boys, mystery among the girls, and afforded wonderment and delight to them all. The "Victorians" much appreciate his efforts. They would also thank Mrs. Pankhurst, who very kindly presented the prizes for the best dressed dolls, and presided at the Christmas cake. Several members of the Council, as well as the Secretary, are also thanked for their esteemed presence and for the kind assistance they rendered. The little folks dispersed at the close, all in high spirits, and each carrying away some little souvenir of the party of 1893—certainly not the least successful of our annual gatherings.

An analysis of the various British, Colonial, and Foreign journals has again been made, and will in due course appear in the Journal. It is gratifying to know that the analyses made in past years have proved of value to many of our members, and have in consequence been much appreciated.

Numerous photographs have been taken of the various places visited by the Society, and a considerable number of lantern slides have been made to illustrate "Victorian" lectures. We are proud to remember that a series of photographs, taken by several of the "Victorians," formed part of the wedding gift which was presented by the Society to our President, H.R.H. the Duke of York, K.G., on the occasion of his marriage in July last.

The "Victorians" have to thank the Italian Consul, the Chevalier R. Froehlich, who, at their request, obtained from Captain Casati, of Central African renown, fine cabinet photographs of himself and Gessi Pasha. Lantern slides have now been made from these and added to the Society's collection of African heroes.

The lantern management at the various meetings of the Society during the winter has been again conducted very successfully by one of the most energetic of the "Victorians." The Hon. Secretary would specially draw attention to this work, which is really of a very arduous character. It is feared that the bulk of our members little realize how much they are indebted to the gentleman who so ably conducts this branch. The preparation, conveyance, fixing, and adjustment, and the packing-up and removal of the lantern apparatus and screen, before and after each meeting, is a much heavier and more thankless task than the actual working of the same. This, it should be remembered, is conducted not only at most of the Society's own meetings,

but also at a larger number of "Victorian" meetings held throughout the surrounding districts.

In the other and various matters connected with the arrangement of maps and diagrams, and the display of curiosities, &c., at our gatherings, the "Victorians" have again done their best for the comfort and edification of the members—they trust with success.

It may be mentioned that already applications are being received for the delivery of lectures for the coming winter, the work of which bids fair to equal, if not exceed, that of the past season.

The following is a list of the subjects upon which the "Victorians" will be prepared to address meetings, those marked with an asterisk being illustrated with lantern slides:—

- | | |
|---|---|
| 1 *Physical Geography (three lectures).† | 20 British East Africa. (I.B.E.A.) |
| 2 *Maps: What they Mean and how to Read them.† | 21 *Uganda. |
| 3 The Geography of Ireland. | 22 The Central African Slave Trade. |
| 4 *The Manchester Ship Canal. | 23 Railways in Africa. |
| 5 The Caledonian Canal. | 24 The Proposed Mombasa-Victoria Nyanza Railway. |
| 6 The French Canals. | 25 Commercial Products of Central Africa. |
| 7 The Dutch Canals. | 26 The Great Lakes of Central Africa. |
| 8 *Columbus: His Life, Times, and Work. | 27 *Across Africa with Stanley. |
| 9 *The Mediterranean. (A Study in Comparative Geography.) | 28 *Chicago. |
| 10 *From Paris to Moscow. | 29 The American Canals. |
| 11 The Canton of Uri. (Illustrated). | 30 *Canada.† |
| 12 The Boundary-lands of China, Russia, and England. | 31 Australia: Its Discovery, Exploration, and Development.† |
| 13 *India—the Country and People—Antiquities and Architecture.† | 32 *Polar Exploration (Arctic and Antarctic). |
| 14 *The Partition of Africa among the States of Europe. | 33 *Dr. Nansen and the North Pole. |
| 15 *Britain's Expansion in South Africa. | 34 The Romance of Geography. |
| 16 *The Nile: History of its Exploration. | 35 The Buccaneers. |
| 17 The Suez Canal. | 36 *Christian Missions and Geographical Discovery.† |
| 18 *The Congo: Its Discovery and Exploration. | 37 *From Liverpool to San Francisco. |
| 19 British Central Africa. (Nyasaland.) | 38 *From England to Japan. |
| | 39 The Value of Geography to Commerce. |
| | 40 The Use of Photography as an aid to Geography. |

† These Lectures are intended to be a Course.

The "Victorians" are pleased to be able to report so large an amount of work done during the past year; they look forward hopefully to the future, and trust that their usefulness may still further increase. It is hoped that this report will be considered a fair record of useful work done during the past season. The "Victorians" will feel more than repaid if their labours meet with the commendation and continued approval of the Council and members of the Manchester Geographical Society.

56, Ducie Grove, Manchester.
June, 1894.

J. HOWARD REED, Hon. Secretary.

REPORT ON THE WORK OF THE ORDNANCE SURVEY IN RELATION TO THE REPORT OF THE DEPARTMENTAL COMMITTEE.

*To the Council of the Manchester Geographical Society, and to the Delegates Committee
of the Corresponding Societies of the British Association.*

I have pleasure in acceding to the wish of the Council that I should draw up a memorandum on the recent inquiry into the condition of the Ordnance Survey.

The Committee appointed in the spring of 1892 published its report with the minutes of evidence and appendices in February, 1893. Early in the present year the Board of Agriculture, which is now the Department controlling the survey, published its observations in the shape of a minute on the Committee's report. More recently we have had the Director General's Report of Progress to 31st December, 1893, the Civil Service Estimates, 1894-5, and the subsequent discussion thereon in Committee of Supply. We are therefore now in a position to form opinions not only as to the value of the inquiry but also on its probable effects on the productions of the Survey. The Report itself is both confused and inconsequential. The evidence and appendices, however, supply useful information for anyone interested in reform of the Survey. Consequently, although the immediate outcome of the Report has been productive of more harm than good, the ultimate result may be beneficial by reason of increased public interest aroused and the better knowledge obtainable of the sources of weakness and failure in the business of the Department.

The Terms of Reference were that a Departmental Committee be appointed to inquire and report upon the present condition of the Ordnance Survey, and especially to consider:—

1. What steps should be taken to expedite the completion and publication of the new, or revised, 1-inch map (with or without hill-shading) of the British Isles?
2. What permanent arrangements should be made for the continuous revision and speedy publication of the maps (1:500—towns—25-inches, 6-inches, and 1-inch scales)?
3. Whether the maps as at present issued satisfy the reasonable requirements of the public in regard to style of execution, form, information conveyed, and price; and whether any improvement can be made in the catalogue and indexes?

The report on the first head of references is devoted to "considering the chief reasons for delay." The official excuses seem to have satisfied the Committee that nothing could be done to expedite the new 1-inch map, and that it was not practicable to complete it before 1910. As an indication of the value of the excuses, it is worthy of note that a few months after the report was published Mr. Gardner told the House of Commons that the impracticable was to be accomplished and the map completed by 1902. Previous to my paper at the British Association, at the Leeds meeting of 1890, the date of completion for this map was 1925.

It is necessary to bear in mind, as I have frequently pointed out, that our survey has concentrated in its hands the whole official cartography of the nation, embracing

every kind of map, from cadastral plans to the smaller topographical and chorographical maps. The Committee utterly failed to do this; they continually confused statements, criticisms, and considerations applicable to one or two maps alone with others relating to the whole series, and floundered hopelessly amongst the mass of criticisms and suggestions offered to them. Consequently, although the evidence and report indicate much painstaking investigation, the value of the report is neutralised by bad recommendations, unsupported by evidence of any weight, and stultified by many futilities.

This is particularly conspicuous in their report under the second head of reference in which they are asked to devise permanent arrangements for continuous revision of all the maps. That the ruin of the survey was at hand if revision was not attended to had been generally recognised for some years, so that it was mere waste of time for the Committee to demonstrate its necessity. Had the Committee, however, contented themselves with this, and with registering such self-evident facts as that a map on a large scale will cover more sheets of paper than a map of the same district on a small scale, no harm would have been done, but they went quite beyond their province and outside the reference in the series of proposals which they make for the mutilation of the survey and depreciation of the maps. In regard to the cadastral survey, they did not see that a scale which is sufficient for country districts is not sufficient for towns. Granted that a cadastral survey is necessary, it is obvious that the scale under all circumstances must be sufficiently large to enable the map to subserve all cadastral purposes. This was fully understood by the officials of the survey 60 years ago, when $\frac{1}{12500}$ (the 6-inch scale) was considered sufficient for the country, a scale ten times greater, viz, $\frac{1}{2500}$ (5-feet to the mile) was adopted for the towns. Subsequently, after the memorable International Congress at Brussels, and after exhaustive inquiry at home, the scales adopted were $\frac{1}{2500}$ (25-inch scale) and $\frac{1}{1250}$.

In giving evidence before the Committee I said little about the purposes and value of a cadastral survey, thinking that these were everywhere recognised; and I certainly never supposed that a Committee which was requested to say what should be done to bring all the maps up to date, and to say if any improvements were desirable, would recommend that a large portion of the maps should be allowed to become derelict, and that information which they now convey should be no longer given.

In their remarks under the third head of reference the Committee display an inability to grasp some of the most elementary principles of cartography.

The passage on hill-shading would be amusing were it not depressing to find that the Committee had not, after months of study, any better idea than that depth of shade is connected with the height of the ground. The report continues: "In respect of systems of hill-shading it is possible that the last word has not been spoken." Let us hope it has not. They also say, "If any partial change were made in the method of production, the hill-shaded maps of England and Scotland, if mounted together, would not match or join properly." The English and Scotch maps are on different meridians, the sheet lines and shape of the sheets do not correspond, and in both cases are not filled up beyond the border, so that it requires six sheets of the English map to complete one of Scotland. The expressions "matching and joining properly" in this connection would seem somewhat incongruous.

A specimen map from the Imperial Military Geographical Institution of Vienna seemed to the Committee "superior to the general character of those ordinarily on sale." It did not occur to the Committee that the same might be said of many of the specimens from Southampton which were before them. Of the one-inch map they find that "no map excels it in combination of accuracy, beauty, and clearness," but

nothing is said of the relative quantity of information conveyed, which after all is of some importance, as maps are presumably made for use as well as ornament.

The list of complaints and suggestions on page 22 is a conspicuous example of the absence of method in the investigation; it is an extraordinary jumble of various matters having little or no connection with one another.

The remarks on contouring are very disappointing. It is said that the opinion of "so eminent a Committee as that of 1854 must carry great weight." One would have thought that the lapse of time would have qualified the value of any scientific report of forty years ago, however eminent its authors. The present Committee, too, overlooks the fact that that of 1854 was appointed because of the outcry of scientific men, consequent on the report of Lord Elcho's Committee, which had recommended putting an immediate stop to the system of contouring, and also that even on the Committee of 1854 the advocates of contouring were in a minority. The opinion of the International Conference of 1853 seems to have had no weight with the Committee, or they would not have made their mutilating recommendations concerning the cadastral survey, whilst the opinion of a Committee of 1854 is sufficient to prevent them recommending a proper representation of the ground in topographical maps.

Several instances were brought to the notice of the Committee of changes in the methods of production, or modes of representation, for which there was no apparent corresponding advantage to make up for the loss of uniformity. The Committee misses the issue thus raised and says, "If absolute uniformity of style were insisted on it would bar all improvement;" neglecting to indicate any of the improvements for which uniformity has been sacrificed.

They fail, too, to distinguish between publication and construction of maps, and explain the absence from British cartography of any map like the *Carte Vicinale* of France by the disingenuous official excuse that that production is the work of a private firm, and this notwithstanding General Derrécagaix's emphatic statement, in answer to a leading question, that "the firm of Erhard and Co. is in no respect the *Editor* of the map of the *Vicinal Department*" (Appendix No. 8).

I have already, in another place, dealt with the extraordinary defence of the "four-mile" map. I will only add here that this monument of blundering can never be made into a good map, and that it will cost more money to make it even respectable than an entirely new map will cost.

As an investigation into the "condition" of the Ordnance Survey the inquiry was a farce. The condition of a Department cannot be arrived at without inquiry into its organisation and management. This for some reason the Committee seems to have considered itself precluded from doing, although it was an absolutely essential preliminary to a report on the matters specifically referred.

Many of the severest criticisms upon the maps are passed over without notice, whilst large portions of the report are taken up in re-stating the official case for the Survey or defending the Department against charges which have never been made by any one having a competent knowledge of its operations. We do not require to be told that the triangulation was a great undertaking, and that it was well executed. That is a matter of ancient history. Neither do we require praise of the general accuracy of the lesser surveying operations. These were instituted and carried out on an elaborate scale and at great cost, and if the work had not been accurate the country would have had good cause to complain. The time for wondering at these achievements is past, and to read pages of eulogy upon them is like reading the praises of the performance of the locomotive steam-engine or the electric telegraph in the "Penny Mechanic" of forty years ago. The chief ground of complaint was, and is, that the great work of Colby and others is not as effectively utilised as it might be.

In bringing the state of the Survey under notice of the British Association, in 1890, I was careful to state that no competent person questioned the accuracy or the value of the geodetic work of the Survey and of the cadastral maps, or the admirable and almost unsurpassed topographical work in the early 6-inch maps. What I did say was that the cartographical work of the Ordnance Survey showed no advance notwithstanding the enormous strides which have been made in the science of cartography; that this country was the only country with any pretensions to being in the front rank of civilisation which had not a complete, uniform, and accurate topographical map; that there seemed no prospect of our obtaining such a map within the present generation; and that in the more popular chorographical and geographical class of work the productions of the Survey were almost beneath contempt. In technical and scientific matters it is the Department which must lead the way. The Department should educate the public, and not the public the Department.

H. T. CROOK, C.E.

EXAMINATION ON THE GEOGRAPHY OF YORKSHIRE, 1894.

THE REPORT OF THE SECRETARY ON THE EXAMINATION IN GEOGRAPHY, 1894.

THE subject was "Yorkshire." The examination was offered to the children of any school whose standard of education was not beyond the School Board Standard VII.

About 2,000 circulars were sent out to school boards, private schools, evening classes and school committees in Lancashire, Cheshire and Yorkshire.

The examination was taken by the Union of Lancashire and Cheshire Institutes and the Yorkshire Union of Institutes, on Friday, March 16, 1894, from 7 to 9 p.m. The examiners were Mr. H. Yule Oldham, M.A., F.R.G.S., Lecturer in Geography at the Owens College, and Mr. J. D. Wilde, M.A., one of the honorary secretaries. They prepared the syllabus and the examination paper. They have examined the papers worked, and have made a summary report.

Sixty children presented themselves for examination, and paid the entrance fee of 6d. each. The average age of the children is thirteen years and four months. The youngest child was eleven years old, the eldest was seventeen. There were 27 girls and 33 boys.

The examiners have awarded three first prizes, and the average age of this first class is 14 years. The first of the winners of first prizes is a girl 12 years old. Three second prizes were awarded, the average age being 14 years and 8 months. In addition to these six certificates were awarded, the average age being 14 years and 2 months.

The following is the award of the examiners :—

FIRST PRIZES.

Nancie Jackson (12), with Duke of York's Prize.
Harry H. Vlies (14), with Duchess of York's Prize.
Beatrice M. Briggs (16).

SECOND PRIZES.

Alfred White (16).
Stephen R. Oddy (14).
Mildred E. Welshaw (14).

CERTIFICATES.

Cecil C. Railton (15).
 Edith Clifford (15).
 Alfred A. Clarke (14).
 Annie T. Roberts (11).
 Percy Knoop (14).
 Harold Buckingham (16).

There were nineteen papers from Lancashire and Cheshire, forty-one from Yorkshire. The Syllabus, the Examination Paper, and the Examiners' Report are presented herewith.

ELI SOWERBUTTS, Secretary.

(COPY OF CIRCULAR AND SYLLABUS ISSUED.)

MANCHESTER GEOGRAPHICAL SOCIETY.

PRIZES AND CERTIFICATES FOR 1894 EXAMINATION.

Examiners: Mr. H. YULE OLDHAM, M.A., F.R.G.S., Lecturer in Geography to the University of Cambridge and the Owens College, and Mr. J. D. WILDE, M.A. (Oxon).

The subject for Examination for Prizes and Certificates of the Manchester Geographical Society for next year will be

THE GEOGRAPHY OF YORKSHIRE.

The following Syllabus will be of use as a guide to the teachers who intend to present pupils for Examination.

The children in any Public Elementary School up to and including the 7th Standard, and in Private Schools, Grammar Schools or Secondary Schools, of corresponding Standard, in Lancashire, Yorkshire and Cheshire, may compete.

The Examinations will be in writing, and the Examination for Lancashire and Cheshire will be conducted by the Inspectors of the Lancashire and Cheshire Institutes Union, and for Yorkshire by those of the Yorkshire Union of Institutes in their ordinary examination. Candidates will have to present themselves for examination at the nearest centre of the Unions.

The Questions to be answered will be given out to the children by the Inspectors of the Institutes, who will be present the whole time of the Examination.

No notes, text books or other aids may be used at the Examination.

The Papers will be adjudicated upon by two Examiners of this Society.

An Entrance Fee of 6d. must be paid by each candidate. The fee must be sent with the name on entrance.

Five Prizes of £1 each, and Ten Prizes of 10s. each (in books, to be selected by the prize winners), and the Certificates of the Society are offered.

There will be two additional Prizes of the value of £1 each (in books), one for the boy and one for the girl who obtains the highest marks, to be called H.R.H. the Duke of York's Prize and H.R.H. the Duchess of York's Prize.

The Prizes will not be given unless the Examiners are satisfied that sufficient merit has been shown by the Candidates.

SYLLABUS.

The Examination will be divided into two Parts—I. General. II. Special.

PART I.—GENERAL.

Part I. Candidates must show a knowledge of the simple general terms used in geography.

PART II.—YORKSHIRE.

I. THE LAND, WATER, AND AIR.

- (a) Position, Surface, Size, Shape, and Boundaries.
- (b) Mountains, Wolds, Moors, Plains, and Lowlands.
- (c) Sea Boundary, Lakes, Marshes ; Rivers: their Rise, Course, and Basins—their Mouths and Estuaries.
- (d) The Climate ; Rainfall, Heat.

II. THE NATURAL RICHES OF THE COUNTY.

- (a) Mineral Wealth ; the Geology of the County, Caves and Mineral Springs, Mines, Quarries, Coal, Iron.
- (b) Agricultural Wealth ; Food Products ; Industrial Products.

III. THE PEOPLE OF YORKSHIRE.

- (a) A Short History of Yorkshire (very short).
- (b) The Principal Races ; their Origin and Distribution.
- (c) The Homes of the People, Castles, Abbeys.
- (d) Social Conditions ; the Cities, Towns, and Villages.
- (e) The Political Divisions ; Ridings, Wapentakes, &c.

IV. THE TRADE OF THE COUNTY.

- (a) Industries, or the Production of Commodities.
- (b) Commerce, or the Exchange of Commodities.
- (c) Roads, Railways, and Waterways.

Candidates will be expected to be able to draw maps of the whole or part of the county, indicating latitude and longitude, and all answers should be illustrated as far as possible by means of maps and diagrams. A competent knowledge of Part I. and of Section I., Part II., and of at least one of the other Sections, will be required of all candidates for a Certificate.

BOOKS TO WHICH TEACHERS MAY REFER.

- Yorkshire : Scenes, Lore, and Legends, by M. Tait, Maps by F. D. King. Leeds E. J. Arnold), 1888 ; 2s. and 1s. 6d.
- The Geography of Yorkshire, by J. P. Faunthorpe (Philip, London), 1877 ; 6d.
- Geographical Readers, by Charlotte M. Mason. Book III. The Counties of England (Stanford, London), 1889 ; 2s. 6d.
- Gill's Geography (Gill & Co., London), 4s. 6d. (Diagrams and Maps.)
- Geography of the British Isles, by Hughes and Williams (Philip, London), 1892. 1s. 6d.
- Chisholm's Geography (Longman's, Green, & Co.) ; 3s. 6d.
- Tourist's Guide to Yorkshire: East and North Ridings, and West Riding, by Bevan ; 2 vols. (Stanford, London), 1891 ; 2s. 6d. each.
- Abstract of the Census of 1891 (Abel Heywood, Manchester) ; 1d.
- The Statesman's Year Book, by J. Scott Keltie (Macmillan, London) ; 10s. 6d.

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Arnold's Contour Map of Huddersfield and District (Bury to Barnsley), 72in. x 43in., by F. D. King (2 inches to a mile), (Arnold, Leeds); 16s.

Arnold's Contour Map of Yorkshire, by F. D. King (2 miles to an inch), (Arnold, Leeds); 14s. (a capital map).

Murray's Handbook, Yorkshire, Map and Plan (John Murray, London), 1882; 12s.

The Century Geographical Readers: No. 3, England and Wales. Maps (Blackie & Son); 1s.

The Century Geographical Handbook: No. 3, with Maps (Blackie and Son); 2d.

Home Geography of England and Wales: Bevan. (Sonnenschein and Co., London); 4s. 6d.

(COPY OF EXAMINATION PAPER.)

MANCHESTER GEOGRAPHICAL SOCIETY.

THE GEOGRAPHY OF YORKSHIRE.

Examiners: H. YULE OLDHAM, M.A., F.R.G.S., and J. D. WILDE, M.A.

GENERAL INSTRUCTIONS.

If the Rules are not attended to, the Paper will be cancelled.

Candidates for a Certificate must show a competent knowledge of Part I., and Section i. and at least one other section of Part II.

Answers should be illustrated as far as possible with maps, plans, or diagrams; but one map, if clear, may be used to illustrate several answers.

PART I.

1. Explain clearly the meaning of the terms Equator, Tropic, Zone, Latitude, Prime Meridian, Contour, Estuary, Watershed, River Basin and Plain.

PART II.

Sec. i.

1. Draw a map of Yorkshire, showing principal rivers, mountains and headlands, and naming the adjoining counties.

2. What is the extreme length and breadth, and the area of Yorkshire? What two counties are nearest to it in size?

3. In what direction and at what distance from York are London, Edinburgh and Liverpool?

4. Compare the temperature and rainfall of Yorkshire with that of Lancashire and account for the difference.

Sec. ii.

1. Show on a map the parts of Yorkshire in which Coal, Iron, Lead, Salt and Jet are found.

2. What is the Craven fault? What famous caves are there in Yorkshire?

3. Explain the origin and growth of the woollen industry in Yorkshire.

4. What is the chief source of wealth in the Plain of York, Cleveland, Hamshire, Holderness and the Wolds?

Sec. iii.

1. What was the position of York under the Romans and Early Saxons?
2. What is the meaning of the names Barwick, Conisborough, Doncaster, Huddersfield, Rotherham, Scarborough, Sheffield, Whitby, Esk and Ouse? And what do they tell us of their origin?
3. What historical events are connected with Beverley, Marston Moor, Northallerton, Ravenspur, Stamford Bridge, Towton, Wakefield, and the Castles of Middleham, Pontefract and York.
4. What is meant by the Dalesman, and the terms Riding, Wapentake, Force and Fell?

Sec. iv.

1. Show on a map the position of Barnsley, Bradford, Dewsbury, Halifax, Leeds, Middlesborough, Rotherham, Saltaire, Sheffield and Whitby. Name the chief product of each and give population of three largest.
2. What Seaports has Yorkshire? With what countries is their chief trade carried on, and what are the principal imports and exports? What seaport is nearest to the largest three towns of Yorkshire?
3. What Railway Companies have lines in Yorkshire? Show on a map the communication between York and Manchester.

EXAMINERS' REPORT.

THERE were 60 candidates, whose average age was $13\frac{1}{2}$ years, the eldest being over 17 and the youngest 11; of these 33 were boys and 27 girls, and the following 7 boys and 5 girls obtain prizes and certificates:—

FIRST PRIZES.

Nancie Jackson, Northcote Girls' School, Armley, Leeds, 12 years.
Harry Huson Vlies, The Hulme Grammar School, Manchester, 14 years.
Beatrice Maude Briggs, Northcote Girls' School, Armley, Leeds, 16 years.

SECOND PRIZES.

Alfred White, The Hulme Grammar School, Manchester, 16 years.
Stephen Roberts Oddy, ditto, ditto, 14 years.
Mildred Ellen Walshard, Northcote Girls' School, Armley, Leeds, 14 years.

CERTIFICATES.

Cecil Carleton Railton, The Hulme Grammar School, Manchester, 15 years.
Edith Clifford, Northcote Girls' School, Armley, Leeds, 15 years.
Alfred Aldred Clarke, The Hulme Grammar School, Manchester, 14 years.
Annie Theresa Roberts, Northcote Girls' School, Armley, Leeds, 11 years.
Percy Knoop, The Hulme Grammar School, Manchester, 14 years.
Harold Buckingham, ditto, ditto, 16 years.

N. Jackson and H. H. Vlies gain respectively the two additional Duke of York's and Duchess of York's Prizes, given to the girl and boy obtaining the highest marks.

The examiners regret that a case of unfair conduct occurred in the examination, which they have to bring before the Council's notice.

To some extent the work done was very creditable, showing considerable care on the part of the teacher; but in too many cases the signs of insufficient preparation were evident, only one-fifth of the candidates obtaining more than one-third of the total number of marks, which was the limit adopted for awarding certificates. A large proportion of the failures displayed total ignorance of the first part of the paper, but, on the other hand, the maps showed careful study. As can only be expected, in an examination where time is limited, there was often a want of finish and neatness, but the intelligent use of coloured chalks in several cases gave considerable clearness.

With the *Equator*, on the whole, considerable familiarity was shown, which, however, in no case was expressed disrespectfully. The following explanations were exceptional:—

"The *Equator* is a line drawn from north to south through the centre of the earth."

"*Equator* means the centre of the earth."

The *Tropics*, generally dismissed as "places which are very hot," were in some cases, by contrast, placed at the North and South Poles.

Prime Meridian was usually overlooked, but the following answers arrest attention:—

"*Prime Meridian* is the same as P.M., which means past twelve o'clock at noon."

"Latitude means the distance that one place is from another, *Prime Meridian* the exact distance."

"Each town in the same latitude has noon at the same time. *Prime Meridian* is the first meridian and has noon the first."

Contour was a term evidently unknown to most, but a reminiscence of *Cantons* in one case, and an analytical instinct in another, were apparently responsible for the following:—

"*Cantour*, the country is divided into *Cantours* in Switzerland."

"A journey through the *Tropics*."

But perhaps the most remarkable replies were called forth by the well-known, though often misapplied, term *Watershed*. One was original—

"*Watershed* is a range of mountains separating the annual rainfall."

But the following was embarrassing in its involved uncertainty, until the answer which stands next indicated the probable meaning:—

"Supposing a river, where it rises, is under a series of large rocks, and about 4ft. or 5ft., it is called a watershed—something like the roof of a house."

"*Watershed* is a covering over the top of the river."

In Part II., the second question of the first section produced some extraordinary instances of reckless handling of numbers, to which must be ascribed the statement that—

"The area of Yorkshire is 6,000,000 square miles;"

while the vagueness of ideas as to position and distance are well shown by the statements—

"London is about 360 miles from York. Liverpool is about five miles."

"Liverpool, west-east [from York] about 250 miles."

The *Craven Fault* was, as a rule, properly appreciated and explained, but of the three following answers the last two show a refreshing originality of view :—

"The Craven Fault is a series of rocks which instead of being found in the expected (proper) place are found at a different place, whereas a different kind of rock is found in the expected place."

"The Craven Fault is its not being communicated with the sea very much."

"It has too much rain."

Some of the answers to the question about the Chief Source of Wealth in different parts of Yorkshire displayed a commendable desire to get at the root of the matter, but the brevity of two was not equalled in accuracy.

"Chief Source of Wealth :—

| | |
|---------------------|------------|
| Plain of York | Oolite. |
| Cleveland | tin. |
| Hallamshire | lias clay. |
| Holderness | recent. |
| Wolds | chalk." |

"Plain of York, Cleveland, Hamalshire, Holderness, and the Wolds are all spongy and marshy, and in winter it is impassable."

The danger of too great brevity was still better shown by an answer to question 3, of Section III. :—

"Beverley, Marston Moor, Northallerton, Ravenspur, Stamford Bridge, Towton, Wakefield, and the Castles of Middleham, Pontefract, and York were scenes of engagements in the Great Civil War."

The question as to the position of York under the Romans and Early Saxons called forth an essay, which is reserved for the end, and also this answer, which is as pointed as unexpected :—

"The same position as it has now, except that it was smaller and had a wall around it."

From many other interesting answers the following must suffice :—

"Sir Titus Salt founded the woolen industry."

"It was at York that Constantine the Great fought a battle on behalf of his neice, Empress Matilda."

"When a judge went to hold his law courts in a Wapentake he stuck his spear (weapon) in the ground, and it remained till his trials were over."

Several of the above extracts tend to show that, in point of spelling, there was much left to be desired. In this respect many better, or worse, specimens might be given, but one was unsurpassed, namely the statement that one of the "principle imports" of Yorkshire is—

"Greace for the machienary."

Attention should also be called to the grotesque mixture of capitals and small letters often employed in the maps, in such forms as *SheffFieLd* and *LiNcOlNShIrE*, which might be profitably avoided in the future. We have reserved for the end two short essays—one on the "Woollen Industry," the other on "Yorkshire," of which the latter loses nothing in charm from being totally unasked for, and beside the mark.

Essay on the Origin and Growth of the Woollen Industry in Yorkshire :—

“First, the people found out that the wool off sheep's backs was very soft and warm. Then they began to think how they could thread it all together. Third, they began to learn more about it, and now it has become what it is.”

Yorkshire :—

“Under the Romans the county of Yorkshire increased very greatly; they made a network of roads spreading from York all over the county. This was all they did chiefly. The Saxons founded the two kingdoms of Deira and Bernicia. After they invaded the county they killed most of the Romans or made them slaves. The county went back into a state of barbarism. They were very idle race and very cruel. They sacrificed one-tenth of their victims to their gods, and plundered and stole everything that came in their way. They made the women work whilst they drank and enjoyed themselves. They were not afraid of the storms; they enjoyed them rather. They spent there time in just fighting and plundering each other. They were a barbarous and altogether bad race.”

H. YULE OLDHAM.

April 26th, 1894.

J. D. WILDE.

Proposed Railway from Akka (Acre) to Damascus, April, 1894.—The successful opening of the railway from Jaffa (Joppa) to Jerusalem is to be followed by proposals to make a railway from Haifa, through the plain of Esdraelon, along the course of the River Kishon, through the valley of Jezreel to Beisan, and turning north on the right bank of the Jordan, will cross that river a little south of the Sea of Galilee, thence taking a north-easterly direction, skirting the Hauran, finally reaching Damascus through the plain. Branches will run from Akka, joining the main line just below Mount Carmel. Another will leave the main line at Mount Tabor and will run along the westerly side of the Sea of Galilee and along the Upper Jordan Valley past the Lake Huleh (waters of Meram), to Dan, and on to the foot of Anti-Lebanon at Hasheira. Another branch leaves the main line at Nawa and crosses the Hauran in a south-easterly direction, finishing at Bosrah. If the capital is found for this line it will be an important event in the history of this country. The permits or firmans have been secured and the concessions granted for the making and securing of the line to the company. There are no engineering difficulties at all. The country traversed by the projected railway includes some of the most productive regions in Syria. The total length of the main line is about 146 miles, and the Haifa branch line is about $3\frac{1}{2}$ miles. There will be 13 tunnels, having a total length of 1,750 lineal yards. It is intended to have 27 stations. Damascus will be placed within five hours and Nawa within four hours of the coast instead of fourteen and twenty-seven hours respectively. The cost from Damascus to the coast is now, for merchandise, £4 8s. 4d. per ton, and from Nawa it is £2 11s. 6d. per ton. By the railway this would be reduced to £1 10s. and 19s. The estimated receipts are given as £223,312 per annum, cost of working at £96,000, leaving a balance of £127,312 for dividends, &c. It is expected that the first 55 miles from Akka to the River Jordan can be opened by September next, and to Damascus, 91 miles further, by the end of 1896. If this line is successfully made a further line will probably be made from Damascus, *via* Aleppo, to Biredjik on the River Euphrates. The share capital of the company is £1,200,000. The engineers are Sir Douglas and Francis Fox, of Westminster. Colonel Surtees, one of the directors of the M. S. and L. Railway Company, is the chairman. This is a most important movement, as it will lead to the settlement of a large population in a most fertile district, which is at present almost depopulated; the produce will be brought within reach of a profitable market. With careful irrigation, following on the regulation of the waterfall, the results of cultivation are most astonishing, and this may perhaps be made an outlet for the resettlement of large numbers of Jews, who are at present being cruelly used in various European countries.

PROCEEDINGS OF THE SOCIETY.

JANUARY 1st to MARCH 31st, 1894.

The 279th Meeting of the Society, held in the Memorial Hall, Wednesday, Jan. 10th, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL, F.R.G.S., F.I. Inst. (Chairman of the Council), in the chair.

Dr. J. A. GRAY, the physician to the Amir of Afghanistan, addressed the members on "Afghanistan and its Ruler" (see page 42), illustrating the address with a collection of native cloths and other products, curios, maps, and lantern views.

The address was listened to with interest, and a hearty vote of thanks was given to Dr. Gray, on the motion of Mr. F. ZIMMERN, seconded by Mr. J. D. WILDE. Mr. GRAY responded, and replied to a number of questions.

The 280th Meeting of the Society, held in the Library, Wednesday, January 17th, 1894, at 7-30 p.m., Mr. R. C. PHILLIPS in the chair.

The minutes of meetings held December 15th (276), 29th (277), 30th (278), January 10th (279) were read and approved.

The election of the following members was announced:—

ORDINARY—Mrs. E. Neild, and Messrs. John K. Dearden, Thomas Dreydel, C. Dyson, J. Howard Hall, Joseph Hodgson, Paul Jaffé, T. W. Kemp, and Edwin Smith.

CORRESPONDING—The Rev. A. Colbeck, Guernsey.

CORRESPONDING SOCIETY—The Free Public Library of the City of Boston, U.S.A. Presentations to the Library were announced and exhibited.

Communications were read from—

Messrs. Gibbs and Mann, Hon. Secretaries Sydney branch of the Royal Geographical Society of Australia, announcing death of President, Mr. C. Merewether, F.R.G.S.

Mr. F. W. Maxwell, announcing the death of his father, Mr. J. Maxwell, F.R.I.B.A., F.S.I.

* * Letters of condolence were ordered to be sent to Sydney and to Mr. Maxwell.

Royal Scottish Geographical Society, forwarding a resolution indicating the election of the Manchester Geographical Society as a Corresponding Society.

Mr. J. P. Thomson, Brisbane, forwarding his paper on "Fiji," subsequently read. Royal Scottish Geographical Society, in reference to the new "Atlas of Scotland."

Mr. W. N. Greenwood, Glasson Dock, referring to papers relating to the Ship Canal.

The Trustees of the Public Library of the City of Boston, gracefully acknowledging the election of the Library as a Corresponding Society.

Miss E. M. Clerke, on Ship Canal papers.

Rev. A. Colbeck, Guernsey, acknowledging his election as a Corresponding Member.

The following letter from Mrs. Bruce :—

10, Regent Terrace, Edinburgh, 20th Dec., 1893.

Mrs. A. L. Bruce returns her sincere thanks to the Members of the Manchester Geographical Society for their kind expression of sympathy with her and her family in the sad loss sustained by them through the death of her husband.

Other letters were read.

GEOGRAPHICAL "STUDY" MAPS.

A series of Maps, prepared on equal projections for MSS. purposes, in relation to Meteorology, Travel, &c., very beautifully printed and arranged, with a description of the purpose of the Maps and the proposed method of use, were exhibited. They are produced by Mr. A. Stegemeir, of Copenhagen.

The members examined them minutely, and it was concluded that for many purposes of scientific research and record they would be very valuable.

The SECRETARY and Mr. REED read a lengthy paper on "Fiji" by Mr. J. P. Thomson, F.R.S.G.S., of Brisbane. Considerable discussion ensued on the paper and on other subjects. Thanks were passed to Mr. Thomson.

The 231st Meeting of the Society, held in the Library, Friday, January 26th, 1894, at 7 p.m.

The Rev. S. A. Steinthal and some of the Council received the members.

Collections of photographs lent by Mr. J. C. Blake, Mr. J. Saner, and others, were exhibited. Mr. J. J. GLEAVE explained a number of sketches of English scenery. Slides, recently added to the Society's collection, were shown in the lantern. An Italian cake, sent by Captain Casati through the Chevalier Froehlich, was duly disposed of.

Votes of sympathy, on the deaths of Mr. John Knowles and Sir Gerald Portal, were moved by the CHAIRMAN, seconded by the Chevalier FROEHLICH, supported by Mr. DENTITH and others, and passed.

The 232nd Meeting of the Society, held in the Memorial Hall, Wednesday, Feb. 7th, 1894, at 7-30 p.m., Mr. MARK STIRUP, F.G.S., in the chair.

Mr. ARCHIBALD R. COLQUHOUN, A.M.L.C.E., F.R.G.S. (First Administrator of Mashonaland), addressed the members on "The Highlands of South Africa." The address was illustrated with maps, lantern views, and a number of articles of native manufacture.

The following is the *Manchester Guardian* report of the address :—

THE FUTURE OF MASHONALAND.

Mr. COLQUHOUN said the partition of South Africa really commenced with the journeys and labours of those magnificent pioneers of civilisation, David Livingstone, Robert Moffat, and, later, H. M. Stanley. It was the work done by those pioneers that gave the impetus to the whole movement throughout South Africa, and resulted in the occupation of the new territories now known as Mashonaland and Matabeleland. In 1887 it became apparent to the whole of the colonists of South Africa, and to Mr. Cecil Rhodes, who was then the leading spirit in that part of the world, that if this country wished to retain a hold upon these magnificent highlands in the interior there was not a second to be lost in moving. Mr. Rhodes, along with others, therefore despatched into the country known as Matabeleland a Commission to secure from the

king a concession for the occupation of the eastern section of his territory, now known as Mashonaland. The mission was successful, and on that concession was built up the royal charter which was given in the next year to the British South Africa Company. The occupation of Mashonaland was planned in 1889, and was successfully accomplished in the middle of 1890. It was most important to understand that the countries known as Matabeleland and Mashonaland were in reality one country, Mashonaland being the eastern half, and being inhabited by a number of slave tribes, the remnants of the aboriginal tribes who had succeeded in escaping extinction at the hands of the Matabele, who only entered the country in 1840. There had been a good deal said in this country with regard to the attitude taken by the colonists in Mashonaland towards the Matabele, and it was therefore important to remember that the Matabele were not the original possessors of the soil. They were a section of the Zulu race who in 1840 found it politic to break away from their own people, and, forcing their way through Zululand under a chief named Umselegazi, the father of Lobengula, they made their way northwards, devastating the whole of the country as they went, until, reaching the neighbourhood of Zimbabwe, they turned westwards and established themselves at the present capital of the country, known as Buluwayo. There had been some discussion also as to the value of Mashonaland, both from an agricultural and from a mineral point of view. When the country was first entered expectation ran very high with regard to its prospects and its future, and in the first stage of occupation there was a tendency to perhaps over-value its resources, succeeded immediately afterwards by a disposition to treat the country as being comparatively valueless. In his opinion neither of those views was correct. He thought there could be no doubt that Mashonaland and Matabeleland were not pre-eminently agricultural countries—that was, countries to which anyone could reasonably wish to direct a large stream of European immigration for settlement there if there was nothing else in the country but agriculture. But the country was good enough from an agricultural point of view as an adjunct to the enormous mineral resources to become in time of very great value indeed. The real value of these territories lay in their mineral wealth, and he believed Mashonaland to be an exceedingly rich mineral, and especially gold country. If it turned out to be the case that Mashonaland and Matabeleland were really good gold countries, the agriculture there would be a most valuable adjunct to their development. It was clearly established that all the fruits and vegetables of northern Europe could be grown in Mashonaland successfully; the climate was on the whole a good one, and very shortly he believed it would prove to be quite as healthy a country as the Transvaal. The highlands of Mashonaland and Matabeleland had one great advantage over the Transvaal and Bechuanaland, and that was that at all times there was to be found a network of running streams of beautifully clear water, so that they had in this highland country, which stood some 5,000ft. above the sea level, a plentiful supply of water, a fairly good soil, and a good climate, and therefore it might be said that the country was perfectly suited to white colonisation. The colonists had been in occupation of that country for three years, and there was undoubtedly throughout this country a certain feeling of disappointment at the amount of progress that had been made. That period of three years might be divided into three sections. When they went in there in 1890 the 700 or 800 men who formed the expedition found the rivers rising in their rear as soon as they got in, and they were practically six months in that country living on the game they could shoot and the little Indian corn they could secure by barter with the natives. Under these circumstances not very much progress could be made with the gold industry, but everything was done that could be done. They had not only these physical difficulties to contend with, but they had enormous political difficulties to

overcome. In the second year supplies had been pouring into the country, and the food difficulty was removed. The political difficulties also had lessened, communications were being made, and capital was being taken into the country which would have enabled a considerable amount of progress to be made. Unfortunately, at the end of the second year difficulties began between the Matabele and the Mashonas, which gradually increased in extent, and practically acted as a sort of paralysis on the country. At the end of the second year it became apparent that the white men out there would have to protect the Mashonas against the raids which were being carried out by the Matabele. The paralysis which was brought about by the action of the Matabele prevented further progress, and while he admitted that the progress made had not been large, he thought it was not just to come to any conclusion as to the gold wealth of the country and its future based upon the comparatively small amount of progress made up to now. In his opinion the future of that country hung absolutely on the amount of gold it contained. It had been said in different parts of the country that Mashonaland was a perfectly worthless country, even from a gold point of view, and that the white men out there, when they discovered that the country which they had occupied with so much difficulty and at such cost was of no value, said they would go and occupy Matabeleland. That was not the case, because Mashonaland had been proved in the last three years to be a perfectly solid and valuable gold country. It was not as rich a gold country as the Randt in the Transvaal, but the tests which had been made showed that at the depths of 200ft. and 300ft. results were obtained which were quite contrary to the predictions made by a great number of people, for they were as favourable as those obtained near the surface, and the yield was sufficiently satisfactory to warrant the firm conviction that when the railway communications with the south and east were perfected, Mashonaland would take its proper position as a gold-mining country. With regard to the position of the Matabele in that country he would like to say a few words. There was in this country, and not unnaturally he thought, a disposition to examine the action taken by the white settlers of Mashonaland with regard to the Matabele in the late campaign, and to ask whether or not they did rightly in making war upon the Matabele. He went into the country with the first expedition; he knew the class of men who went there, and he believed that they and the administration there had honestly tried to avoid a collision with the Matabele as long as it was possible. When they went into that country in 1890 they had the Matabele on the west, very suspicious and not too friendly; they had the Boers on the south, threatening to come in and occupy certain sections and dispossess the colonists; while they had the Portuguese on the east actively unfriendly. The settlers in that country had no desire to make war on the Matabele nation, because from the very beginning every man knew that nothing could be done with Mashonaland except by conciliating the natives of the country generally, the reason being that native labour was an absolute necessity to the progress of the gold-mining industry, and it was only the Matabele labour that was of value, as the Mashonas were a poor, indolent, weak-spirited race, subject to the Matabele, who were a strong and masterful people. While there was no inclination to make war on the Matabele nation, they all from the first expected to be attacked by a section of the Matabele. The Matabele nation consisted of two sections, the military caste or organisation and the non-military, and the colonists knew that they might at any time be attacked by the war party, who were trying to force the King to keep the white man out and to be unfriendly. While, therefore, the colonists were employing the Mashonas for mining purposes, they found that it was absolutely necessary to resent the constant raids which were being made by the Matabele on the Mashonas, and it was this process of protecting the Mashonas against the Matabele,

coupled with the desire to preserve their own possessions and families, that operated to bring about the late war. The Matabele had been carrying on these horrible raids since 1840, and he had not the slightest doubt that in another ten years, if the white colonists had not stepped in to protect them, the Mashonas would have been utterly exterminated, and the whole of their country would have been left absolutely depopulated. Now that the colonists had broken up the military caste of the Matabele, he believed the remainder of the people would settle down to peaceful pursuits, and that there was a much happier time in store not only for the white settlers but for the Matabele people themselves. When the settlers began to take steps to put an end to this military organisation of the Matabele, it was said in this country that the policy was to send 5,000 or 10,000 troops into the country and drive the Matabele nation out of its country north of the Zambesi. Such a policy was never suggested in South Africa; but if such a thing had been done the Matabele would have been driven to a point where they could have been much less easily dealt with, and the military organisation would have continued to exercise its disturbing influence upon the countries south of the Zambesi. The policy of the settlers was very different indeed from that. They saw that what they had to do was to break up this military caste, and having done that at once to take steps to try and conciliate the rest of the people and draw them, and, if possible, the remnants of the military caste, into peaceful pursuits. That was what they were doing now. He had never had any doubt from the beginning that large areas would be set aside for the settlement of the Matabele, and he believed that was what was being done now between Mr. Rhodes and Sir Henry Loch, the High Commissioner in South Africa, and that the settlement arrived at would be satisfactory both to the colonists and the Matabele. Although it would not be a market for this country for a few years yet, he thought that, taking all the circumstances into consideration, it would be a magnificent heritage for this country, and that instead of cavilling at the work being done by the small handful of their fellow countrymen out in those distant outposts of the empire, every man, woman, and child in this country ought to be exceedingly grateful to them for what they were doing.

Discussion followed, to which Mr. COLQUHOUN replied; and a vote of thanks having been passed and responded to, the meeting closed at a late hour.

The 233rd Meeting of the Society, held in the Memorial Hall, Wednesday, Feb. 21st, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL in the chair.

Lieut.-Colonel C. M. WATSON, R.E., C.M.G., addressed the members on "The Suakin-Berber Route to the Soudan" (see page 107), referring particularly to the question of the need and value of a railway from Suakin to Berber. Colonel Watson Pasha was with General Gordon in the Soudan, and was, more recently, Governor-General of the Red Sea Littoral. The address was illustrated with maps and lantern slides from Colonel Watson's diagrams and photographs.

Colonel PROUT (who was also with General Gordon on the Nile) spoke of the few difficulties that would have to be overcome in making a railway from Suakin to Berber, and said that if the railway proposed by Ismail Pasha had ever been completed it would never have paid working expenses, much less any interest on the original investment. His own estimate of the cost of a line from Suakin to Berber was about £4,000 a mile, or about a million sterling. Manchester people had had some little recent experience as to the value of preliminary estimates, so that perhaps they would take his *cum grano*. It was probably not a very wild estimate, however,



Stanford's Geog. Estab^t London

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and if they would agree to raise £1,000,000 and put it in his hands he would agree to give them a very fair railway across that country. The fact was that it would really be a very easy line to build, but before they put any money into it they ought to insist upon having a very careful survey made right through the mountains.

Some questions as to the products of the Soudan and the kind and amount of trade were put, to which Mr. A. B. WYLDE, of Suakin, replied.

Alderman BOSDIN LEECH moved a hearty vote of thanks to Colonel Watson Pasha, Colonel Prout, and Mr. A. B. Wyld, for their valuable addresses, which was seconded by Alderman BOWES, and supported by Mr. H. T. CROOK, Mr. LOUIS P. NOTT, Mr. J. HOWARD REED, The Chevalier FROEHLICH, Mr. J. D. FAIRLEY, and others.

The Chevalier FROEHLICH, in supporting the resolution, said: In connection with the most interesting and instructive address Colonel Watson has favoured us with, it may not be judged out of place for me to briefly state some particulars of an important event which took place just two months ago to-day, in Eritrea, the Italian colony, so named after an ancient denomination of the Red Sea. For some days the dervishes under Hamed Ali, Emir of Gaballat, and other well-known chiefs, were very restless, evidently preparing a surprise for the Italian advanced post at Agordat, west of Keren. Thanks to the excellent organisation of his Intelligence Department, Col. Arimondi arrived at Keren in time to concentrate at Agordat a force composed of seven companies of native infantry under Italian commissioned and non-commissioned officers, two squadrons of cavalry, and two batteries of artillery—in all about 1,500 men. On December 21st, at three o'clock in the afternoon, a dervish force, estimated at having numbered at least 10,000, made its appearance on the road towards Agordat, threatening the right of the Italian position, and, in consequence, destroying communications with Keren. Colonel Arimondi, expecting a night surprise, and seeing that the small force at his disposal would be taken at a great disadvantage, decided upon attacking the enemy at once. A pitched battle took place, for two hours, conducted with the utmost vigour; the dervishes then broke and fled, in complete disorder, across the River Barrea, leaving upwards of a thousand dead, among them their chief and other leaders, a considerable number of wounded, a great many arms, two Gatlings, and upwards of 70 flags and standards. Six thousand of the faithful were armed with rifles, and the remainder with spears. The Italians lost four officers and 98 native soldiers dead, besides two officers and some men wounded. Colonel Arimondi pursued the enemy as far as Kufit, on the road to Kassala; but the Government at Rome, while immediately telegraphing King Humbert's congratulations, asked him to reconduct his victorious troops to Italian territory at Agordat. Lord Rosebery, in congratulating the Italian Government, referred to the victory of Agordat as being of great importance to both Italy and England. Most European nations engaged in colonisation have from time to time met with occasional reverses and lost many valuable lives during their operations. The Italians seven or eight years ago received a severe lesson at Dogali; the French in both their Asiatic and African possessions—quite recently near Timbuctu; the English, from time to time in South Africa; and the Germans, in the Cameroons have also suffered. The Italians by their recent brilliant victory amply avenged Dogali, and for some time to come, at least, secured peace and trade to those parts.

Mr. WYLDE in replying to a question on the trade of the Soudan, referred to his address to the Chamber of Commerce given on the 22nd of Feby. The following is the *Manchester Guardian* report:—

Mr. WYLDE reminded the meeting that a paper of his on the Red Sea trade was read at Manchester to the British Association, in 1887, in which he touched on the question of trade with the Soudan. Since that date he had again spent most of his

time in trying to open up trade from the Soudan Coast to the interior. Arriving at Suakin in August, 1889, he left again in July, 1893, more convinced than ever that the only settlement of the Soudan question by peaceful means was to be obtained by commerce and the opening of communications with the trading and agricultural population of the interior, so as to give the natives a commercial future, instead of allowing them to remain cut off from civilisation and face only with an unsympathetic military party, who knew little and cared less for commercial people and their avocations. He first commenced to have personal dealings with the Soudanese in 1875, when he was British Vice-Consul for the Red Sea, and allowed to trade. After visiting every portion of the Red Sea, part of Abyssinia, and the Nile valley around Berber and beyond Khartoum, he reported to Her Majesty's Government what was required to push British commerce in the Red Sea; and on his resigning in 1878, so that he might take up the question of increasing the trade facilities and of starting a railway from Suakin to Berber, grants were made from the Civil Service or Consular Estimates for Consuls at Jeddah, Hodeidah, Masowah, Suakin, and Khartoum, and in the place of the £400 which attached to the Jeddah Consulate, about £6,000 per annum was set aside for the purpose of paying British representatives to look after our commercial interests at those different places. Had officials been sent to all these places the Government might never have had to face those troubles that began in the Soudan in 1882. We were now in a less advanced position than in 1874, and instead of Manchester selling more piece goods than she did at that date, she was not getting rid of a tenth of the quantity, and in consequence British merchants and workmen might be said to have been the losers of many millions of trade in this part of the world alone. He believed other markets had been lost to Manchester as well from want of attention, and if this city was to get its fair share of African trade, or even to retain what she now held, she must let no more opportunities pass. As long as the present policy was carried out at Cairo, not only Manchester but all England stood a very good chance of being cut out entirely from those markets. Nothing could be better for Italian and French interests than to keep the Suakin route closed to the interior and to prevent the English Foreign Office officials from dealing with the question. Mr. Wyld described the events which preceded and followed the fall of Tokar, and stated that at the time Colonel Sir Charles Halled Smith left, in the summer of 1892, the whole coast line, which in the summer of 1889 had been unsafe, was opened to commerce, tribal ports were opened, and the roads from them to the interior were being used by the inhabitants, who came into the tribal ports for what they wanted instead of continuing to deal with the smugglers and slave dealers from Arabia. A certain amount of cultivation was going on, and there would have been more had the landowners been treated properly. Trade with the Nile was prospering and increasing in great strides; hundreds upon hundreds of Jaleen and other merchants from the interior, not only from the Nile but as far as Kordofan and Darfur, had visited Suakin, and they were one and all delighted that trade was again opened up, the general opinion being that under the then Governor General the commercial and agricultural element of the Soudan would in a very short time be able to deal with the Baggaras the rulers of the country, who were despised by all for their savageness, uncouthness, and brutality. Had Osman Digma or the Baggaras come back to the country while the Governor General was there the majority of the tribesmen would have joined him to drive back the enemy. Immediately after General Sir Francis Grenfell left Egypt, and Sir Charles Halled Smith left Suakin in 1892, Colonel Kitchener was made Sirdar, orders were issued from Cairo that the arms given to the tribesmen for their defence were to be recalled, and on Osman Digma appearing at Tum-e-yum, some 80 miles from Suakin, with a small force of under 200 men, the town gates at Suakin

were closed to trade, thereby imprisoning many merchants from up-country, and not only entirely disorganising their traffic, but breaking faith with them in every way. It was on record that it was not the wish of the majority of Englishmen that trade with the Soudan through Suakin should be put a stop to, and in 1838 the House of Commons was most explicit on this point, and, moreover, members on both sides of the House were most indignant at the way in which the tribesmen were treated by the military officials then at Suakin and now in power at Cairo. If, as had been seen, it was certain that by pursuing a fair and just policy in the Soudan littoral, without much trouble and without any heavy expenditure, pacification could go on, the people would be contented, while trade improved, why, in the name of common sense, was any other than this policy allowed? Peace and prosperity could be enjoyed under one set of officials, while under others they had miseries and horrors that people in England, he was thankful to say, knew nothing of. In less than six months after Colonel Sir Charles Holled Smith's departure all the good that had been done for the country had vanished. The roads were insecure, trade was at an end, cultivation was impossible, the weaponless and disorganised tribesmen were driven hither and thither by Osman Digma and his followers, the men were massacred, the wives and daughters were taken as the wives of the Baggaras, and their flocks slaughtered—this in spite of the promises that had been made by English officials. There was no blame to be attached to the local authorities at Suakin. They only obeyed Cairo orders. Of that he was certain. To him it seemed as if there was no wish on the part of the Cairo authorities to do anything for that part of the Soudan or to drive away Osman Digma; as the officer commanding the cavalry, when he applied for five days' rations, so that he might go to Tum-e-yum, was only allowed three, which prevented him getting further than Singat, and the whole reconnaissance was entirely useless. They were told that Suakin was held for military reasons, so as to get to the back or on the flank of any hostile force going down the Nile to Egypt. It was a long way from Suakin to the Nile, and as Suakin was now held it did not prevent a force passing between its outside forts and Handoub. There were two remedies that might be adopted that would have a beneficial effect on that part of Africa. The first was taking over the remaining portion of the Soudan littoral that Egypt had abandoned, and administering it in the same way as had been done with the Somali coast opposite Aden. The second was to administer Suakin from Downing Street instead of from Cairo by an English Commissioner. At present the Suakin district was costing about £120,000 per annum to maintain, or Egypt paid that sum to carry on a dog-in-the-manger policy of preventing trade and, from a merchant's point of view, of doing the wrong thing towards herself and to the people of the country. Receipts at Suakin and on the littoral amounted to about £25,000 per annum, and could be trebled if trade were allowed to go on without let or hindrance. History showed that the military party had always been the ruin of the country and an unnecessary source of expense. The only reason for an Egyptian army was an unfriendly Soudan. Pacify that country, as he said could be done by trade and by treating its inhabitants fairly, and the cause for taking the fellaheen from their fields would be removed. Without an Egyptian army the empty-headed demagogues that abounded in Egypt would be powerless to create mischief, and there would be no necessity for keeping up such a large English army of occupation. He urged the desirableness of maintaining an English army of occupation in Egypt, and said that his experience led him to believe that the fellah respected "Tommy Atkins," and would be sorry to lose him, as he looked to him as his protector. With the Soudan in English hands Egypt might be made nearly untenable to a foreign Power, and to attack the Soudan from Egypt when held by the English was more than any European Power would care to

attempt. Let them see what could be done in Manchester and other large industrial centres of the United Kingdom to win back the Soudan as a market for our home productions. He was entirely against another English soldier being used in that part of Africa—first because they were not wanted, and secondly because any fighting that might be required to open up the country could be done by the negro, officered by Englishmen, and the inhabitants themselves, who wanted to get rid of the Baggaras. What Manchester could do was to petition the Secretary of State for Foreign Affairs to deal with the question on the lines he advocated. No doubt Liverpool, London, Glasgow, and Birmingham would follow. The next step would be for the Secretary of State for Foreign Affairs to appoint an official whose sympathies were with the Soudanese tribesmen. He mentioned three officials who had had experience in the country and who would bring about what was required—General Sir Charles Warren, R.E., now on his way home from Singapore; Colonel Sir Charles Holled Smith, now in London unemployed; and Colonel Watson, R.E., the friend of the late General Gordon. There could be no difficulty in appointing any one of those officers, only a disinclination to do so, and that disinclination, he thought, could be overcome by petitioning that the Soudan should be opened to trade, thereby finding employment for the many in this country and saving the unnecessary bloodshed that still continued in the Soudan. In six months trade might be opened up again, and the district round Suakin be as quiet as it was when Sir Charles Holled Smith left it. The moment the environs of Suakin became quiet there would be no difficulty in carrying out a survey of the Suakin-Berber route as far as Ariab, about 180 miles from the coast; and after Ariab to the Nile there were no engineering difficulties whatever, and the cost of the remaining portion might be calculated on the basis of the surveyed portion. The tribesmen, with their sheiks, were unanimous in wishing a railway made, as it would give more employment to their men and animals, and save them having to undertake the long and tedious journey to the coast. He pointed out that a good supply of water could be obtained all along the route. The moment a railway was made from the coast to the Nile the question of opening up the Nile Valley became an easy task. The pains and discomforts of African travelling were only known to those who had pioneered the country. If a railway were made to Berber and proper steamers put on the Nile those difficulties would be overcome. Instead of ten days across the desert to Berber, the Nile would be reached in as many hours. With modern steamers on the Nile at the end of the railway the Nyanza lakes would be reached comfortably in as many days as it took months to reach them at present. Cargoes from Manchester, now that the Ship Canal was opened, could be delivered through all the vast territories that were to be reached by the waters of the Nile with a transhipment at Suakin and another at Berber. But the field that would thus be opened was too vast and too interesting to contemplate or to dismiss in a haphazard manner such as that in which he now touched upon it. He could foresee the time when the practicability of the scheme would be realised, and when we should all say, "Why was it not done before?"

Colonel C. M. WATSON, invited by the chairman to say a few words, said he was utterly unable to understand why men of business in England had so entirely neglected the important subject which Mr. Wylde had brought before them. There they had that enormous country which could be opened up by a short line of railway and yet Englishmen would have nothing to say to it. He went over the route in 1874, and it then seemed to him that the line would certainly be laid at once, but here we were twenty years after and nothing had been done. While we had been going in for all kinds of African enterprises and talking of the necessity of making a line 650 miles long, from Mombasa to the Victoria Lake, we neglected this simple and

easy route to the Soudan. It was as if a man blocked his front door and then made a long ladder to get in his house by the fifth-story window. The Suakin-Berber railway would cost £4,000 or £5,000 a mile, and the distance to be covered was 260 miles.

After some discussion, in which Messrs. E. Sowerbutts, F. Spence, and A. B. Wylde took part,

The CHAIRMAN said the board of directors would pay great attention to the address that had been delivered. They were debarred at that meeting from passing a resolution, but the board, and especially the African Committee, would give the matter very great attention. Of this they were all convinced, that there were markets along the Red Sea littoral and in the valley of the Upper Nile which were as yet hardly touched by commercial enterprise. He hoped means would be found to get at those markets.

Mr. L. P. NORT, in proposing a vote of thanks to the lecturer, asked what existing railway 260 miles long could tap 3,000 miles of navigable waterway. Such a railway was one of the few things in the world not already done that was worth doing.

Mr. R. P. HEWITT seconded the resolution, and said that if anything was to be done the initiative and the stimulus must come from commercial ranks. The Government looked only to the political and military aspect of the question, and would have to be pushed on by those who were interested in the commercial aspect.

Mr. S. L. KEYMER (chairman of the African section) and Mr. Alderman LEECH supported the resolution, which was unanimously adopted. The proceedings then concluded.

THE RE-OPENING OF THE SOUDAN TO TRADE.

To the Editor of the Manchester Guardian.

SIR,—The visit to the Manchester Geographical Society on the 21st instant of Colonel C. M. Watson, C.M.G., R.E., a former friend and coadjutor on the White Nile of General Gordon, together with the address to the Manchester Chamber of Commerce on the following day by Mr. A. B. Wylde, of Suakin, will doubtless tend to arouse local interest in the question of the re-opening to trade and civilisation of the great Nile Soudan region, over which so dark a pall has hung since the Mahdi's insurrection. Colonel Watson, whose personal appearance, by the way, reminds one strongly of Gordon, was for some time Governor General at Suakin. He surveyed the whole course of the White Nile for the 900 miles between Khartoum and Lado, the head of that reach of navigation; and the subject of the practical address he will deliver to the Geographical Society on Wednesday evening will be "The Suakin-Berber route to the Soudan," which he has traversed, and with which he is quite familiar. He will probably show that, so far from being a waterless desert, that tract of country is permanently peopled by Arabs, and has some singularly picturesque scenery. Mr. Wylde, whose long residence on the Red Sea littoral at and around Suakin has made him the great authority on the Northern Soudan, will detail to the Chamber on Thursday afternoon the practical trade policy which, he maintains, could without difficulty be adopted both by the Government and the British merchant to restore and greatly increase our former large trade through this solitary eastern entrance into the heart of trading Africa. Those who have read Sir Samuel Baker's charming book "The Nile Tributaries of Abyssinia," and who remember its idyllic pictures of Arab pastoral life on the surpassingly fertile plains sloping gently up to Abyssinia, its description of the magnificent cotton lands drained by Nile feeders—each navigable for steamers in the rainy season—and its account of the beautiful

Basé country, rich with minerals and game, rising steadily to the eastward and finally culminating in enormously elevated plateaux, will understand me when I say that Abyssinia has only a back door to the Red Sea—a mountain wall of almost impracticable height—and that the front door for her varied products and those of all the vast region of the Nile basin, whose one practical outlet is at Suakin. There are evidences, indeed, in ruins here and there, to indicate that Suakin was the port of the once powerful empire of Meroë, whose site was the “island” tract enclosed by the Blue Nile and Black Nile or Atbara. As indicating the capabilities of this limited portion of the Soudan I may quote the following remarks on Meroë from the last edition of “Chambers’s Encyclopædia:” “There stood from time immemorial an oracle of Jupiter Ammon. This and the central portion of the island, together with the extraordinary fertility of its soil, the abundance of animals, metals, &c., made it not only the chief place of resort for all the inhabitants of the adjacent parts, especially the numerous nomad tribes, but also the emporium for India, Arabia, Ethiopia, Egypt, Libya, and Carthage. Thus it grew so rapidly that about 1,000 B.C. it counted among the most powerful States of the ancient world; and about 760, having ever since Sesostris been tributary to Egypt, it succeeded, under Sabacus, in shaking off the Egyptian yoke, and continued in its turn to hold Egypt for about 60 years. During the reign of Psammetichus 240,000 Egyptians settled in Meroë, which (the greater part of the immigrants being artisans, traders, &c.) rose still higher. Many new cities were built, and the State was in the most flourishing condition when it was conquered by Cambyses, about 530 B.C. He fortified the capital town and called it Meroë. After the destruction of Thebes by Cambyses most of the inhabitants of that city took refuge there, and made the country still more Egyptian. Ergamenes transferred its theocracy into a military monarchy in the third century. Under Augustus, Meroë was conquered, and a queen, Candace, is mentioned as his vassal. Under Nero nothing but ruins marked the place of this once powerful and highly civilised State. Up to this day remnants of mighty buildings covered with sculptures, representations of priestly ceremonies, battles, &c., and half-defaced inscriptions hewn in rocks, besides rows of broken sphinxes and colossi, are frequently met with in those parts.”

Crossing the Nile westward we come to Kordofan, Darfur, and the still more distant sultanates towards Lake Tchad—all of them with populations more or less familiar with the Hausa language, and having those civilised wants which create and foster trade. The whole of this immense territory has only one easterly highway to the sea—the Nile basin and Suakin. To say nothing of other advantages to these peoples, what a boon it would be for their numberless Mecca pilgrims, so many of whom now die of cholera upon the road, if a railway were constructed between the Nile and Suakin, with disinfecting depots at both termini. South of the Blue Nile and of Kordofan and Darfur, and right and left of the White Nile all the way up to Lado, and west of this again along the many river feeders of the rich Bahr el Ghazal country (numbers of these hundreds of miles long) to the Congo watershed, there are vast areas of finely watered lands which might yield incalculable quantities of tropical and sub-tropical produce. In the case of the extensive malarious tracts east and west of the White Nile the river would doubtless have to be cleared of the “sud,” or floating vegetation, which now more or less chokes its channel, to enable the inundated lands to drain themselves after the periodical floods. Above Lado and on through scores of miles of fine rolling park-like valley and mountain country of the most varied character, and bearing indiarubber trees and numberless other economic plants, and peopled by exceedingly interesting races, to the uplands of Unyoro and Uganda, and beyond as far as the upper floor or England of Africa—the

-cool 8,000 feet Mau plateau from which much of the country will probably one day be administered—the natural outlet to the sea may still be considered to be the Nile valley and Suakin. Below the Victoria Nyanza, and at each end of the fine navigable reach of the Nile which receives the Albert Nyanza, there are probably waterfalls enough to work a railway some day electrically the entire distance up to the gigantic lake from the lower reach of navigation at Lado.

There is probably no river basin in the world which is and has throughout all history been so full of interest to the trader, the agriculturist, the mining, mechanical, and civil engineer, the naturalist, and the ethnologist. Many of its Arabs are teetotallers, of magnificent physique and patriarchal bearing and behaviour. Some of the Soudanese tribes are the very finest of the African races—*e.g.*, the Dar Nubas of Kordofan, so well described by Ohrwalder, and who, though within striking distance of Omdurman, remain still unconquered by Abdullah's dervish hordes. The hydrography of the basin from the Mau plateau to the Mediterranean—including the vast Victoria and Albert reservoirs (the latter draining Stanley's lordly Ruwenzori), the Clear Nile, the White Sobat, the Blue Nile, the Black Nile or fertilising Atbara, the rich depression of the Fayoum, the empty Wady Raian hollow waiting Cope Whitehouse's restoration of Herodotus's great blue lake for feeding low Niles, and the wonderfully irrigated delta—is a monument of divine engineering, every part of it full of most interesting and fruitful and practical problems. The little bit of territory which Egyptian irrigation has won from the rainless desert in the delta, and which does not exceed the the area of Ireland, is a mere fraction to that south of Suakin, nearly all of which is watered by tropical or sub-tropical rains. With such a pregnant region before us, now all but sealed up against civilisation, it is difficult for us as a nation to elude the question. Have we not a serious responsibility for the dog-in-the-manger policy by which we have at Suakin for so many years bottled up the whole Soudan against European influences and trade? And does not the blood of Gordon cry out to us to at least exhaust all moral means to put an end to the deeds of devilry which, Ohrwalder tells us, are constantly being perpetrated by the Mahdi's successor, Abdullah? Knowing that seven-tenths of the population of the Soudan were slaves—this was stated authoritatively in the House of Commons at the time—we deliberately abandoned them to the tender mercies of the Mahdi's slave-holding dervishes. Shall we not now with all haste endeavour to make amends for our past defaults? Events occurring in the Soudan will certainly help us if we adopt this course. Ohrwalder has shown that Abdullah's cold-blooded decimation of some of the best of the Arab tribes whom he suspected has alienated many of his followers, and that Mahdism as a religious force really got its death-blow when the Mahdi died, everybody having supposed him to be immortal. Your columns showed not long ago what a severe defeat Abdullah's dervishes had sustained at the hands of the Italians.

Mr. Wylde, who knows the northern tribesmen well, will, I believe, be able to show us how peaceably their sheikhs are disposed towards us, and how easy it would be to win them over to us by substituting at Suakin a persistent policy of trade and friendly relations for the present costly, irritating, and worse than barren Egyptian military *regime*. That fairly accomplished, events might then be trusted to make the course clear for the long-projected railway to the Nile, which, as Colonel Watson will demonstrate, presents no real engineering difficulties, and which would enable the delivery of goods to and from the great interior waterway at such a vastly reduced cost that the imports and exports would be almost indefinitely increased. Our annual national expenditure of over £140,000,000 in drink—Manchester's share of this being nearly £3,000,000—is draining the life-blood from much of our home industry and, still worse, our domestic and social life. Our commerce, already reeling under the dis-

astrous monometallic experiment of the last two decades, has the added serious obstacle to overcome of markets taken from us by protective duties imposed mainly to meet the needs of an insatiable militarism which, I am sorry to think, we have as a nation not even promoted a European conference to abolish. Here, however, is a magnificent field for our trading enterprise. Shall we, with the spirit of the Phœnicians, the Rhodians, and the colonising Athenians of old, set ourselves persistently and unflinchingly to avail ourselves of it?—I am, &c.,

Manchester, February 16, 1894.

FRANK SPENCE.

The *Manchester Guardian* made the following comments on Mr. Wylde's paper:—

"Nobody, we should think, in England has a more intimate knowledge than Mr. A. B. Wylde of the condition of trade in the Soudan, and the address which he delivered yesterday must have deeply impressed the Manchester Chamber of Commerce. Mr. Wylde looks at the question of the Soudan from the point of view of the British trader at Suakin on the Red Sea. He sees vast possibilities of trade to westward and south-westward, but very little already going on, and the little often interrupted. Berber, on the Nile, is only 260 miles west of Suakin, and from Berber the natural means of communication with a great reservoir of African trade are easy. Above Berber the Nile is a good waterway right up to the Nyanza lakes. But below Berber the river is so barred with cataracts as to be half useless. Goods brought down from the Upper Nile country to Berber by water, if they are to reach the sea by way of Egypt, must be taken on camels for 400 miles to Korosko, then by river again for more than a hundred miles to Assuan, with a lift by rail past the first cataract, then by boat again for another 300 miles to Assiout, with a lift by rail for 360 miles to Alexandria. It is clearly more advantageous to go straight across from Berber to Suakin and get on shipboard at once, with no further transshipment to look forward to, than to incur the cost and delay of four transshipments between Berber and the Mediterranean. It was Mr. Wylde's purpose yesterday to show, first, that there is not at present anything like the volume of trade by either route that there might be; secondly, that the military policy of the British authorities at Suakin, as directed from Cairo, is responsible for the stunting of this commerce; and thirdly, that a railway ought to be made from Berber to Suakin.

"As to the first point we think that everybody agrees. The native traders of the Soudan have for many years been utterly discouraged by the insecurity caused by the raids of the dervishes. The raiders are not, we believe, well armed or well organised or very numerous, but they move with great rapidity, live on little, and are supported in their attacks on quiet cultivators and traders by their confident expectation of paradise. When Osman Digma appeared some time since at a distance of eighty miles from Suakin itself, all trade and industry were for the time at an end. The merchants were cooped up in Suakin, where the British garrison is, the trade routes into the Soudan were absolutely closed, and the cultivators felt that they were only tilling the land to feed their enemy, and to make it possible for him to quarter himself the longer upon them before retiring to his own deserts. Mr. Wylde finds a double fault with the British authorities. In 1892 orders were sent from Cairo to Suakin for the disarming of the presumably well-disposed tribesmen to whom arms had formerly been given for the defence against the raiders. This is the first complaint. The second is that the British force garrisoning Suakin has since 1892 made

no serious attempt to keep the trade routes open and the freebooters out of the peaceful districts by the strength of its own arm. 'In less than six months,' Mr. Wylde told the Chamber of Commerce, 'after Sir Charles Holled Smith's departure [in 1892] the roads were insecure, trade at an end, cultivation impossible, and the weaponless tribesmen harried hither and thither by Osman Digma and his followers.' We must say that this account is confirmed in almost every part by an observer who looks at Egypt and the Soudan from so thoroughly different a point of view as the Egyptian correspondent of the *Journal des Débats*. This Anglophobe writer agrees that 'the economic condition of the country is lamentable;' that the dervish raids, together with the bad seasons of 1888 and the following years, have half-ruined the farmers; that commerce has come down almost to zero; that the roads are unsafe; and that the misery of the people has caused an increase of brigandage. Trade still goes on, he writes, to a certain extent, between the districts of the interior, but as between the Soudan and foreign countries it has come to a standstill. The correspondent of the *Débats*, being French, hints that the British officials have no real fear of inroads on Egypt from the Soudan, and the forays of Osman Digma and the other disturbers are tolerated and advertised in order to be used as an excuse for continuing the British occupation of Egypt. Mr. Wylde simply notes that the policy of keeping a garrison at Suakin without using it as a police force in the adjoining country is defended on the ground that Suakin is intended to be a thorn in the side of any serious invader of Egypt from the South—nothing more.

"The commercial advantages of the policy advocated by Mr. Wylde are so obvious that we need not dwell on them. It may also be said, from the political point of view, that the pacification and civilisation of the Soudan, if these could possibly be hastened, would do much to hasten the wished-for day when we shall keep our word of honour and leave Egypt. On the other hand, before directly supporting any definite line of policy we should like to hear a full estimate from the point of view of the military authorities in Suakin and Cairo of the difficulties we should have to meet and of the responsibilities we might directly and indirectly incur by rescuing the peaceful Soudanese with the high hand from their native persecutors. Father Ohrwald's accounts in his 'Ten Years' Captivity in the Soudan' gave the impression that the martial fanatics who disturb the country above Assouan are still firmly possessed with the idea of a great crusade against heretical Egypt, and the occasional engagements of the last ten years give the impression that the Egyptian soldiers, though much improved, are not yet a match for the Soudanese, who cut them up in 1883 and 1884. We do not for a moment mention these things as being destructive of any contention urged by Mr. Wylde, but it is difficult to believe that the policy of the British officials at Cairo is simply a piece of perversity. Why their course of action at Suakin was reversed in 1892 we do not understand, and the immediate effects of the change on the material condition of the Soudan undoubtedly seem to have been bad. The proposal must be looked at all round, and Mr. Wylde is to be cordially thanked for describing one aspect of it very clearly and forcibly, and, we hope, for stimulating an interest in others."

The 284th Meeting of the Society, held in the Chamber of Commerce Room, Monday, February 26th, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL in the chair.

The minutes of meetings held January 17th (280), 26th (281), February 7th (282), 21st (283), were read and approved.

The election of the following members was announced :—

ORDINARY—Messrs. W. A. Arnold, Joseph Crossley, Edward G. Hawke, B.A., Thomas Price, James Rogerson, and H. Willett.

ASSOCIATE—Mr. Jno. M. Ely.

A number of presentations to the Library were announced. Letters and communications were read from—

Mr. R. E. Dennett, complaining of the action of the Congo Free State, on the Lucula River, in exacting from traders large arrears of duties, to which he states they are probably not entitled.

Rev. W. Porter, M.A., Masasi, on his recent experiences in East Africa.

The Geographical Society of Toulouse on the death of the President, M. Lemosy D'Orel, and the funeral orations.

* * A letter of sympathy was ordered to be sent to the Toulouse Society.

Mr. J. P. Thomson, Brisbane, informing us that Mr. J. H. Maiden was to them unknown, and was not a founder of the Geographical Society.

Letters from Mr. Lees Knowles, M.P., Lady Portal (the widow of Sir Gerald Portal), and from Miss Shillinglaw were read thanking the Society for votes of condolence.

LAKE NYASA RAILWAY.

An interesting paragraph from the London Correspondent of the *Manchester Guardian*, relating to railways in the Nyasa district, was read. The paragraph is here given :—

"The mail has just brought reports of an extremely interesting meeting held at Blantyre, in the Shiré highlands, to promote the building of a line of railway connecting the Lower Shiré with Lake Nyasa. At present steamers from the mouth of the Zambesi have a practically unbroken course to Chiromo and, during the high river, to Katunga; but from this latter place a long stretch of rapids compels a breaking of bulk and a portorage of some seventy miles over the Shiré highlands to the upper river. All goods for Blantyre or for the regions beyond have to be carried by porters, and this primitive mode of transport is obviously quite unsuited for the present development of the country. Not only is the neighbourhood of Blantyre itself producing large quantities of produce for which a market must be found outside Africa, but the Shiré river is also part of the great central waterway into the heart of the continent, and the tedious portorage through the Blantyre highlands adds immensely to the cost of the route. If a light railway could be built it is clear that it would be of enormous advantage both to British Central Africa and to the region beyond. Eventually it is hoped that a line of about two hundred miles in length will be built from Chiromo to Lake Nyasa; and Mr. J. Buchanan, C.M.G., who is taking a prominent part in the movement, estimates that a light single narrow-gauge line could be built for about £500,000. It is not, however, proposed to build the whole line at once, but probably only the section from Katunga to Blantyre. A committee has been formed to collect all the necessary information and to bring the matter before financiers in this country. An appeal for assistance is also to be made to the British Government. The scheme has the warm approval of the British Commissioner."—*February 23rd, 1894.*

An address on "British East Africa," by Mr. George S. Mackenzie, was read.

Two short communications, by Mr. Mark Stirrup, F.G.S., on the question of the Mammoth were read.

THE TRUE HORIZON OF THE MAMMOTH.—I.

BY MARK STIRRUP, F.G.S.

IN some recent articles contributed to the *Geological Magazine*, Sir Henry H. Howarth has sought to establish by a great array of authorities, both British and foreign, the pre-Glacial, or at least pre-Boulder Clay, age of the Mammoth.

As Sir Henry claims to have proved his case—a proposition which probably few geologists will admit—and “calls upon those who still maintain a post-Glacial existence of the Mammoth to prove their case,” I will attempt to offer some little evidence to show that the conclusion he has arrived at is scarcely warranted by the facts.

In order not to unduly trespass on the limited space, I do not intend to analyze the value of the British evidence which Sir Henry has adduced, as that has been already criticised by Mr. A. J. Jukes-Brown, but propose to confine myself simply to the consideration of the foreign evidence.

In doing so, I shall endeavour to follow as nearly as possible the path which Sir Henry has traced, and shall rely for rebutting evidence on some of the authorities he has himself quoted. His survey commences with Switzerland, and amongst other quotations, he cites somewhat at length the famous lignite beds at Dürnten and Utznach. The unsatisfactory character of much that has been written on these deposits he seems to feel, and certainly the record of the animal remains found in them will not strengthen the position he has taken up, for if they prove anything at all in support of his thesis, they prove far too much. The beds are acknowledged to be much disturbed in places, and yield not only the bones of the Mammoth and the Woolly Rhinoceros, together with the Pliocene beasts *E. antiquus* and *R. leptorhinus*; but animals of a later type, such as the cave-bear, the urus (*Bos primigenius*) and Elk, and also of existing species, as for instance the Red Deer, *Cervus elaphus* (see Heer’s “Primeval Switzerland” and Prof. Rütimeyer).

If Sir Henry Howarth claims the Mammoth for a pre-Boulder Clay animal, he will scarcely be bold enough to claim all its associates in these lignite beds as of a like age.

Turning now to the authority of M. Favre, who is cited as “saying distinctly that the Glacial beds with their erratics, which are greatly developed in the neighbourhood of Geneva, are superimposed on the so-called ‘alluvion ancienne,’ i.e. the stratum in which the Pleistocene animals occur.”

The phrase, “alluvion ancienne,” as used by Swiss geologists, has not a fixed application, as will be seen from the following extract taken from Prof. Favre’s “Recherches Géologiques dans les parties de la Savoie,” vol. i. p. 32, in which he describes the Terrace Alluviums in the neighbourhood of Geneva as belonging to the prehistoric age, but which are perhaps contemporary with Man.

M. Favre goes on to say “that some authors call them ‘alluvions anciennes,’ and others *post-Glacial* alluviums. They never contain striated stones nor erratic blocks. They are *superimposed* on Glacial beds, etc.” (the italics are mine).

But further, Prof. Favre expresses himself explicitly on the point under discussion as to the true horizon of the Mammoth (*op. cit.* p. 50.): “The remains of *Elephas primigenius* found in our country are valuable in that they fix in a very positive manner the age of that animal—they come from the *post-Glacial* beds.”

Again on page 52, M. Favre says: “In the interior of Jura, bones of *E. primigenius* have been found at Tenay upon the railway line from Lyons to Geneva, and on the other side of the chain, near Poligny, remains of this animal have been gathered in the sands and gravels *above* the Glacial beds with polished and striated stones. It

is still in the post-Glacial alluviums that the bones of *Elephas primigenius* have been met with near Tullins in Dauphiny. It is then evident that if the *E. primigenius* lived during the Glacial epoch, a fact which does not appear to me yet sufficiently proved, it has equally inhabited our country during the formation of the terrace alluviums." From the above extracts it will be seen that Prof. Favre's opinions afford no support to Sir Henry Howorth's contention.

M. Falsan, another authority quoted by Sir Henry, but apparently only on the question of inter-Glacial periods, classifies in his Synoptical Table (*vide La Période Glaciaire*) of the Pliocene and Quaternary Beds of the Environs of Lyons, *E. Primigenius* as post-Glacial, and occurring in the Lehm, uniformly spread over the ancient or Glacial alluviums.

In the valley of the Rhine it is also in the superficial loamy deposits called Lehm or Loess, which certainly belong to the closing phases of the Ice-Age, that we find the most abundant remains of the Mammoth and its contemporaries; moreover, the cavern deposits of both England and the Continent afford ample evidence of the co-existence of Man and the Mammoth.

In America, Sir Henry Howorth says the evidence seems to be very contradictory. It is truly a stumbling block to the acceptance of his conclusions. The remains of the Mammoth and Mastodon are well known to occur there in the most superficial deposits. Prof. Shaler says: "Almost any swampy bit of ground in Ohio or Kentucky contains traces of these animals; and at Big Bone Lick the remains are so well preserved as to seem not much more ancient than the Buffalo bones which are found above them."

Indeed, the evidence of the true Mammoth having existed in America, long after the period of the Northern Drift, seems so conclusive, and is so well known to geologists, as to be almost beyond question.

In bringing these criticisms to a conclusion, with that of the Russian evidence, on which Sir Henry, relying on the opinion of his "old masters" has always laid great stress, I propose, instead of resorting to ancient history, to bring forward the published researches of living and recent explorers for the refutation of my friend's postulate.

For the first example I quote the stratigraphical and palæontological testimony afforded by the recent investigations of M. Tchernyschew quite at the North of Russia in Europe, in the Timan district of the Province of Archangel (*vide Bull. Com. Géol. St. Pétersbourg, Tome x. p. 95-147.*) This explorer says: "All around the Timan chain extend immense plains occupied by mosses and marshes—region of Tundra. Striated pebbles abound everywhere, the quaternary glacial sea formed a vast gulf which extended as far as the line of the rivers Tzylma—Volonga. Above and transgressively on these deposits, sands and gravels are met with containing bones of *Elephas primigenius* and *Rangifer tarandus*."

Stronger evidence still, but of like character, comes from that so-called "home of the Mammoth"—North-East Siberia—where those vast accumulations of the bones of the Mammoth occur, which have always excited the greatest wonder and perplexity.

A Russian scientific expedition, under the auspices of the Academy of Sciences of St. Petersburg, has recently returned from the exploration of the New Siberian Islands and the mainland opposite the Yana district, between the rivers Lena and Indigirka.

The scientific results of the expedition are in the course of being classified and published in the Memoirs of the Academy. Two of these Memoirs have already appeared, and a third has just been finished, bearing the title "The Bed of Fossil Ice in its Relation to the Deposits of Mammoth Carcases," by Baron de Toll.

I have not yet seen this last Memoir, but am indebted for my knowledge of its contents to the remarks and analysis of M. Schmidt, when calling attention to the work at the meeting of the Academy on the 27th January, 1892.

It has been long known that in North Siberia, as well as in certain regions of North America, ice is met with in the ground under the form of a rock. To this ice several names have been given by different authors, and Baron de Toll proposes a new name, that of the ice-rock (*Steineis*) or fossil ice. Of this he distinguishes three types: (1) that filling fissures in the ground; (2) the beds of ice in the valleys; (3) that of the continuous horizontal beds, very frequent in the New Siberian Islands, and upon the mainland opposite.

Upon this ice are *superposed* the recent argillaceous beds containing the bones of quaternary animals, and even their entire carcasses.

Baron de Toll explains in the following way the finding of Mammoth bones and carcasses in or upon this palæocrystic ice, in which, he says, they were *never* originally enclosed. In spring, the waters scour in part these upper beds of clay, and the bones as well as the carcasses fall to the bottom; it is thus that they are then found, quite at the bottom of the series of these beds.

The remains of a Mammoth found by M. de Toll in the Valley of Bar-Ourikh, to east of the town of Oust-Yansk, were found in the argillaceous beds which covered some thick beds of the valley ice. In the large island of Linkhof, one of the New Siberian group, he was shown the place where the carcass of a Mammoth had been found in a great cleft which had affected the upper stratum of clay as well as the upper layer of ice; the carcass had fallen to the bottom and was thus preserved in the ice. Analyzing in detail all the information relating to the famous Mammoth carcass brought by Mr. Adams (1806) to St. Petersburg from the mouth of the Lena, Baron de Toll arrives at the conclusion that this carcass had likewise fallen from above to the bottom of a crack in the ice, and was consequently found "in the middle of blocks of ice," according to Mr. Adams' expression.

This explanation gains support from the explorations of Dr. Dall, in Alaska (quoted by Prof. Wright, "Ice Age in North America," pp. 33-35), where the conditions are much the same as in Siberia, and where large numbers of the bones of the Mammoth also occur, and which are often found at the foot of the ice-cliffs in Eschscholtz Bay. Dr. Dall, after speaking of the vegetation of the tundra and its luxuriant growth of herbage, adds: "The formation of the surrounding country shows no high land or rocky hills from which a glacier might have been derived and then covered with *débris* from their sides. The continuity of the mossy surface showed that the ice must be quite destitute of motion, and the circumstances appeared to point to one conclusion, that there is here a ridge of solid ice rising several hundred feet above the sea and higher than any of the land about it and *older* (*italics mine*) than the Mammoth and fossil horse, this ice taking upon itself the functions of a regular stratified rock."

It appears to me that this recent evidence shakes to its foundation that memorable phrase of Cuvier (*Discours sur les Révolutions de la Surface du Globe*), based on the assumed proof of Adams' Mammoth having been frozen up in the solid ice where found, suddenly and without warning. "Cette gelée éternelle n'occupait pas auparavant les lieux où (les Mammouths) ils ont été saisis; car ils n'auraient pas pu vivre sous une pareille température. C'est donc le même instant qui a fait périr les animaux, et qui a rendu glacial le pays qu'ils habitaient. Cet événement a été subit, instantané, sans aucune gradation," etc.

If Sir Henry Howorth is able to prove his postulate of the pre-Glacial or pre-Boulder Clay advent of the Mammoth, there is, undoubtedly, I think, unimpeachable

testimony of its existence long after the great cold, and up to the close of the Quaternary period, which would thus justify the application of Geoffroy Saint Hilaire's name of *Dicynodotherium* to the Mammoth, as the beast that had lived through two epochs.

THE TRUE HORIZON OF THE MAMMOTH.—II.

By MARK STIRRUP, F.G.S.

IN the abstract of the proceedings of the meeting, on November 8th, of the Geological Society of London, I notice that on the reading of Mr. G. M. Dawson's "Notes on the occurrence of Mammoth Remains in North-West America," the author cites the presence of Mammoth bones in a layer of clay *resting on* the "ground-ice" formation of the northern coast of Alaska and other areas.

I drew attention to this position of the Mammoth bones *above* the solid ice both in North Siberia and Alaska, as proved by several explorers, in my paper on "The True Horizon of the Mammoth" (Geol. Mag., No. 345, p. 107, March, 1893), in which I claimed for the Mammoth an existence long after the period assigned for its extinction by Sir Henry H. Howorth.

I see that Sir Henry, in the discussion of the paper, very naturally disagreed with the conclusion of Dr. Dawson as to the age of what is called by American geologists the "ground-ice" formation, and was of opinion "that this ice has accumulated since the beds were laid down in which the Mammoth remains occur, and that the ice was not there when the Mammoth roamed about in the forests where he and his companions lived."

Furthermore, he is reported to have said that "humus and soil cannot accumulate upon ice, except as a moraine," both of which statements are controverted by the explorations of recent and competent observers who have examined these regions.

In support of my contention I need only refer Sir Henry to the explorations of Dr. W. H. Dall in the Alaskan regions (which I quoted in my previous paper), and to the evidence of other observers which Dr. Dall summarises in the Bulletin of the United States Geological Survey, No. 84, pp. 260-267, recently issued. Dr. Dall, speaking of the "ground-ice" formation, says "a remarkable formation has been recognised in many places in the northern part of Alaska, in which solid beds of ice of considerable thickness perform the functions of rock strata, and are covered by beds of blue clay containing numerous remains of Pleistocene mammals, or by beds of alluvium which sustain a layer of turf, with ordinary profuse herbage of the region, or even small thickets of birch, alder, and other small Arctic trees."

These mammalian remains include, among others, tusks, teeth and bones of the Mammoth, *E. primigenius*, bones of *Bison antiquus*, and the Musk Ox. The mode of origin of this ground-ice formation is undoubtedly difficult of explanation, but its position *beneath* the Mammoth-bearing beds is uniformly the same, whether in the cliffs of the coast or in those bordering the Alaskan rivers.

Dr. Dall, referring to the stratigraphical position and mode of accumulation of the bones, says, "that all the circumstances point towards the view that the ice *preceded* and subsequently *co-existed* with animals whose remains are not found in its vicinity."

Lieut. J. C. Cantwell, United States Revenue Marine, reporting on the Kowak river ice-cliffs discovered by him in 1884, says "they are composed of solid ice, covered by a layer of dark-coloured earth, uniformly about 6 feet thick, the whole rising to a height of 15 to 150 feet, with trees 4 to 8 inches in diameter growing on the surface." He goes on to say, "quantities of Mammoth tusks were observed in

this clay and its débris, where undermined by the stream. These clays are doubtless of the same age as those in which the Mammoth remains are found at Elephant Point, over the ice-cliffs."

In consideration of your valuable space, I refrain from quoting further evidence as to the superposition of the Mammoth beds over the solid ice stratum.

The question of the food supply necessary to the existence of the extinct herbivorous mammals which once roamed those arctic plains seems to be settled by the actual existence of an abundant, though arctic, flora in these apparently inhospitable wastes.

Travellers speak of the dense thicket of willow through which they have to push their way, and also of the luxuriant growth of grass covering the peaty or clayey soil.

Moreover, Dr. Dall mentions, singular as it may seem, the fact of dwarf birches, alders, 7 or 8 feet high, with stems 3 inches in diameter, and a luxuriant growth of herbage, including numerous very toothsome berries, growing with the roots less than a foot from perpetual solid ice.

Sir Henry Howorth's explanation of the mode of formation of these massive beds of ice by filtration of water through the soil is certainly inconsistent with the structure and purity of the ice. The ice, 50 to 150 feet thick and upwards, where exposed in sections of the cliffs, is described by several observers as pure, clear ice. Dr. Dall says "the ice in general had a semi-stratified appearance, as if it still retained the horizontal plane in which it originally congealed. The surface was always soiled by dirty water from the earth above. This dirt was, however, merely superficial."

The facts that I have thus briefly cited are wholly opposed to Sir Henry Howorth's assumption that the present is the coldest period known in recent geological times in Siberia and Alaska, and further, I contend that the elaborate arguments and conclusions embodied in his "Mammoth and the Flood" and his "Glacial Nightmare," so far as they rest on his assumption of the pre-Glacial age of the Mammoth, receive no support from the evidence derivable from North Siberia and Alaska.

Mr. J. C. BLAKE, F.R.G.S., F.I. Inst., gave an address on "A Summer Holiday in Kent and Sussex" (see p. 183, vol. 9.), illustrating his remarks with a map, and numerous drawings, prints, and photographs.

Mr. WILDE and Mr. BIGGS also gave some reminiscences, and a number of questions were asked and replied to.

A vote of thanks, proposed by Mr. W. ALDRID, seconded by Alderman BOWES, brought the meeting to a close.

The 285th Meeting of the Society, held in the Memorial Hall, Wednesday, March 7th, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL in the chair.

The CHAIRMAN gave a short address on "Prince Henry the Navigator," in celebration of the fifth centenary of the birth of Prince Henry.

PRINCE HENRY THE NAVIGATOR.

By the Rev. S. A. STEINTHAL, F.R.G.S., F.I. Inst.

We welcome this evening once again, a gentleman who has on several occasions delighted the Manchester Geographical Society with lectures, full of instruction and illustrated with views which have given us a vivid impression of the beautiful scenes

which he has visited, and which have shown the artistic taste which is so often wanting in photographic views, but which never seem to fail Mr. Mellor.

Twice has he guided us through some of the most picturesque scenes of France, rich in historic interest, and has combined the pleasure which his lantern gives with the additional charm of well chosen facts gracefully and graphically told. To-day he intends to take us over less well trodden ground, but still through scenes connected with events in which our ancestors took no unimportant part.

Portugal has a history in which all geographers must be interested. She led the way in the fifteenth century for the discoveries, which revealed the road to the Indies along the long hidden coast line of Africa, and opened the Equatorial Seas, which were believed to be peopled with monsters, and exposed to a heat too great for human endurance, till the Portuguese dared to sail across them. To their skill and courage mankind owes the inspiration of Columbus, and his adventurous successors; for it was while under Portuguese influence that he conceived the idea that by sailing westward he must reach the same land which Prince Henry's captains were trying to find by sailing round the mysterious cape, which the scientific imagination of the princely navigator felt assured, must end the continent of Africa and open a straight path to the riches of India and Cathay.

It was towards the end of the fourteenth century (1381) that England's friendly intercourse with Portugal began, and English troops were sent to aid Portugal in her war with Spain, when John the Great, a few years later, assumed the leadership of the patriotic army which was resolved to prevent Portugal being merged in the realm of Castille. Five hundred English archers, under the command of three squires of John of Gaunt, helped to win the battle of Aljubarrota, (John I., of Castille, was there beaten by John I., of Portugal, in 1385), secured Portuguese independence, and made good the title of the house of Aviz to its throne. In 1386 the Treaty of Windsor was signed, and Portugal and England began that alliance, which I hope the jealousies of the last few years will not be allowed to sever. This union was confirmed on the 2nd Feb., 1387, by the marriage of the king to Philippa, the daughter of "time-honoured Lancaster." I do not wish to enter into further details of the history of the Peninsula, but only to speak of one of the sons who blessed this marriage, the 500th anniversary of whose birth Portugal duly celebrated this week. On the 4th March, 1394, Prince Henry, the fifth child and fourth son of John and Philippa, was born. He was carefully educated with his brothers in all chivalric arts, and won his spurs at the Conquest of Ceuta, in 1415. His fame as a soldier spread far and wide, and he was asked by several courts to take command of their armies. But his mind was fired by another form of ambition than military glory could satisfy. From boyhood his tastes had led him to mathematical and astronomical study. He had conceived the idea that there must be a road round Africa leading to those lands of which such marvels were told by Marco Polo. He resolved to put this conception to a practical test. He settled down in Sagres, a rocky headland which stretches out into the Atlantic at the south-western extremity of Portugal. There he founded a school for navigators, and gathered all the maps and nautical and astronomical instruments he could obtain, and year after year sent forth fresh expeditions to the South, which always returned with tales of new discoveries, encouraging his hopes and strengthening his faith in that ultimate triumph which he was not destined to live to see. I told the story of his persevering efforts in an address I had the honour of delivering to this society some eighteen months ago, and you will find their record in Major's valuable History of his discoveries and their results. No one can speak too highly in his praise. It is difficult for us to estimate aright the wondrous faith he had to enable him to inspire men as he did to risk their lives on unknown oceans in

ships we should think it foolhardy to risk ourselves in while crossing the narrow seas, without a chart to guide them, and with none of those appliances which enable modern seamen to direct their course as if it were buoyed out for them across the waves. To him all modern geography owes its great triumphs, and we can heartily sympathise with the gallant nation, which on Sunday last began to celebrate the 500th anniversary of its hero's birth. On Monday we sent by telegraph the cordial congratulations of our society to Oporto. To Portugal's great prince, Henry the Navigator, we also lay peculiar claim. He was the grandson of Lancaster's great duke, and the Manchester Geographical Society rejoices in his fame with the people who, like ourselves, by naval deeds of daring heroism won for their small country an empire vastly greater than the fatherland.

I feel assured that you approve of what your officers have done, and having so noble a roll of naval chiefs yourselves, will appreciate the pride which the Portuguese feel in their galaxy of heroes, of whom Henry was the morning star.

It is well that just in this week Mr. Mellor should so kindly as well as fitly come to tell us of that land which was his home.

A telegram was sent to the President of the Municipality of Oporto:—

“To the President of the Municipality of Oporto.

“The Manchester Geographical Society of the County Palatine of Lancaster congratulates the Municipality and City of Oporto on the celebration by them of the fifty centenary of the birth of the illustrious Prince, Henry the Navigator. This Society will also celebrate the event, on Wednesday next, the 7th of March.”

(Signed), S. A. STEINTAL, Chairman.
F. ZIMMERN, }
J. D. WILDE, } Honorary Secretaries.
ELI SOWERBUTTS, Secretary.

The President of the Municipality replied:—

“To Manchester Geographical Society, Manchester.

“Thanks and congratulations for the glorious centenary.

“PRESIDENT, Municipality of Oporto.”

Mr. E. W. MELLOR, J.P., F.R.G.S., F.I. Inst., addressed the members on “A Ramble in Portugal with a Camera.” The address consisted of notes on places visited last year, and was illustrated with photographs shown in Mr. Mellor's splendid lantern.

A vote of thanks was accorded to Mr. Mellor for his address and to his friends for their manipulation of the lantern, on the motion of Alderman BOSDIN LEECH, seconded by Mr. J. SAMFSON, and supported by the Chevalier FROELICH.

The 286th Meeting of the Society, held in the Chamber of Commerce Room, Wednesday, March 14th, 1894, at 7-30 p.m., Mr. J. C. BLAKE, F.R.G.S., F.I. Inst. in the chair.

The minutes of meetings held February 26th (284), March 7th (285), were read and approved.

The election of the following members was announced:—

ORDINARY—Messrs. George Ingle Blake, Percy C. D. Blake, M.A., Councillor J. Greenwood, J.P., and J. Pinto Leite.

Presentations to the Library were announced.

Correspondence was read from—

Mr. A. A. Bevan, Cambridge, giving information relative to the International Congress of Orientalists, to be held at Geneva in September. The Very Rev. L. C. Casartelli, M.A., Ph.D., Rector of St. Bede's, has kindly consented to represent the Society at the Congress.

Mr. E. Stanford, on a new book, by Mr. Conway, on "Climbing and Exploration in the Karakorum."

The Liverpool Geographical Society, inviting the officers to their conversazione.

Mr. A. R. Colquhoun, informing us of his illness, and consequent inability to give two lectures arranged for with him.

Mr. Sigetváry, Newchang, with a valuable paper on the "Oak Silk Spinners," which was read subsequently.

Mr. D. Morris, saying too ill at present to give us his promised address on the "West Indies."

Major L. Darwin, M.P., on the sixth International Congress of Geography, to be held in London in 1895.

Professor Giovanni Marinelli, on "The Revista Geografica Italiana."

Mr. Belisha, with syllabus of six lectures on "The Past Biblical History of Israel," by the Rev. L. M. Simmons, B.A., LL.B. The lectures were given in Cheetham, and were attended by some of our members, who were greatly interested, and hoped they might be published.

Mr. J. Ainsworth, Machakos, on the rich natural products of the region, the supply of native labour, and the profit and loss of large development.

The Geographical Society of the Pacific, San Francisco, announcing a "Geographical Day" at the San Francisco Exhibition, and requesting to have papers.

And a number of other interesting letters.

Communications were made to the meeting—

On the proposals of the committee of the British Association to compile lists to form an Ethnographical Survey of the kingdom.

The collisions in West Africa between the French and English forces and the fighting with the Sofas.

A short communication from the Rev. Thomas Wakefield, F.R.G.S., F.R.H.S., was read on

EAST AFRICA.

" . . . thought fled far from me,
To the Afric land by the Zingian Sea."

So wrote Mrs. Burton, who, no doubt, felt closely and sympathetically interested in the great Continent which her husband did so much to reveal, leaving us some of the best books we have of the Geography, Geology, Ethnology, and History—books containing intelligent and learned records of exploits and scientific observations—books which have taken their place amongst the classics of African exploration and research.

All who have spent any length of time in Africa can quote the couplet at the head of this paper. Our friends call us "returned missionaries," but the fact is, in thought, in our wakeful fancies and nightly dreams, we are more in the African Continent, and especially on the shores of the "Zingian Sea," than in this northern island home.

The word "Zingian" comes from an ancient designation of a large portion of the east coast of Africa. In modern days, instead of using Mrs. Burton's classic phrase, the "Zingian Sea," we speak of the Indian Ocean; and it is this great, bright, blue sea which bathes the coast of East Africa, the latter forming its western boundary.

THE SEABOARD

is clearly cut into three political divisions, and is occupied by alien races—that is, by nations or states which have no affinity either in physique, language, religion, or ethnic forms with the people of Africa. These three races are the English, Portuguese, and Arabs.

The geographical divisions are as follows: The northern limit of the maritime British occupation is a little south of Delagoa Bay; the Portuguese coast-line stretches from Cape Delgado to the British possessions; and that of the Arabs—represented by the Sultan of Zanzibar—from Cape Delgado to the Equator. The British and Portuguese possessions extend into the interior; whilst those of the Sultan of Zanzibar have never been regarded as materially advancing inland, and latterly his territory has been delimited and fixed to a ten-miles' width of coast-line.

THE RELIGIONS

introduced into these three sections are Protestant Christianity, by England; Roman Catholicism, by Portugal; and the religion of Islam, by the Arabs.

OTHER POLITICAL CHANGES

have recently altered the map of East Africa, and we have the various European "spheres of influence," in which chartered commercial companies are endeavouring to develop the resources of the interior by bringing the natives into touch with European trade. So we have "German East Africa," which stretches from the latitude of Cape Delgado to Wanga—nearly opposite to the northern end of Pemba Island, and extending inland to longitude 30°. Adjoining the German "sphere" there is "British East Africa," which extends from Wanga to the south side of the River Juba (which enters the Indian Ocean at the Equator), and spreading in a lateral direction to Darfur and Khartoum. This company is sometimes represented by the initial letters "Ibea," which look very much like an African word, and appear as though indicating a newly-discovered region, but the letters simply indicate "Imperial British East Africa." Starting from the Juba river a broad belt of coast-line trending towards the north-east corner of the continent, and laterally to Abyssinia, is a "sphere" which has been allocated to Italy.

When the politico-geographical divisions mentioned above were agreed upon, another change also took place, namely, this—"the islands of Zanzibar and Pemba became a protectorate of Britain, the Sultan being nominal ruler."

THE COLONIAL HISTORY

of the East African seaboard goes back for several hundreds of years. I use the word "colonial" in regard to the annexation by England, Portugal, and the Arabs of those regions which they acquired long ago, and the social, commercial, and national use they have made of them ever since these sections of the seaboard came into their possession.

We shall not concern ourselves in this paper with the history of those parts of the seaboard which are occupied by England and Portugal, but simply with that held by the Arabs.

PERSIAN OCCUPATION.

In very early times there was a Persian occupation of the East African coast-line. Apart from history, there are traces of this occupation in the ruins of arched and sculptured masonry, the sinking of wells in rocky beds, and traditions which are repeated to-day by the natives of East Africa.

The Portuguese navigator, Bartholomew Diaz, rounded the Cape of Good Hope in the year 1496, and in 1500 Pedro Alvarez Cabral was sent to East Africa. But, though these dates carry us a long way into the past, the Arabs were in possession of the African coast on the "Zingian Sea" between seven hundred and eight hundred years before that time.

Dr. Krapf says: "It is well known that the Mohammedan Arabs, during the first period of their history, for one hundred and fifty years, overran a large section of Asia, Africa, and Europe, and that soon after the death of their prophet, Mohammed, they fell a prey to political and religious dissensions, and the defeated party resolved to abandon the land of their birth. Where was a better home to be found than in the fruitful strand of Eastern Africa? There they were already known, and would be safe from the pursuit of their fanatical conquerors. It seems that the first settlements of the kind were made in the year 740 by the Emosais, or adherents of Said, a great-grandson of Ali, the prophet's cousin and son-in-law. Said, proclaimed Caliph by the rebels, was defeated and slain, on which his adherents had to seek safety by flight; and it was in East Africa that they found refuge."

And so, in those early times—as far back as the eighth century—the seaboard in East Africa became the settled home of these Arab emigrants and political refugees. The towns and marts of trade which they then established are there still, and bear the same names by which they were known nearly nine hundred years ago. Most of these towns we have visited, some of them many times, and we were courteously and hospitably entertained by the Arabs of the modern occupation.

OTHERS ON THE SCENE.

In the sixteenth century great changes took place in East Africa. The supremacy of the Arabs was broken and swept from the seaboard by Portugal; but after that there came a terrible reverse to the conquerors, instituting, apparently, a permanent change; for the Arabs, in their turn, expelled the Portuguese, swept them off the coast, from the extreme north to Cape Delgado. Many were the stories the people of the coast told us of the cruelties and massacres which attended the expulsion.

When Mr. New came to me at Mombasa on his first coming to East Africa I took him to see a fine four-square fort, built by the Portuguese on the island, on the angle facing the sea, and quite a crowd of boys and young men followed us; and as we were looking at the old piece of Christian art and masonry, some of our followers seemed to be alarmed, and I heard them say, "Ah, this fort used to belong to white men, and these are now trying to discover a secret entrance by which they (Europeans) may find a passage through which they may get in and once more take possession." I quietly told them that if the English wished to get the fort they could easily do so, without troubling themselves to seek for concealed entrances or secret passages.

TENTATIVE OCCUPATION BY THE ENGLISH.

In the year 1823, Captain Owen, of Her Majesty's ship "Baracouta," was engaged making a survey of the East Coast of Africa, and his charts for many years were the only guides for the ships of all nations in the navigation of that part of the Indian Ocean. Whilst engaged in the valuable duties of this survey the "Mazrui" Arabs, who were at that time in possession of Mombasa and adjoining district, offered to England the island and town and a strip of coast-line bearing from Mombasa northward and southward, and extending for several degrees of latitude. Negotiations were entered into between the Arab authorities and the English captain on the subject, and the Union Jack was tentatively hoisted over the fort. Strange to say, the English

Government declined the free-handed and generous offer of these men, whose sympathies were warm towards the English nation ! This was, no doubt, a huge mistake. It would have been a valuable acquisition for England, of which she would have been glad many a time afterwards, but as France had come into the field the political situation became somewhat hampered. If England had accepted the occupation the past seventy years would have transformed East Africa, would have crushed slavery, would have provided a Canada, by which an open opportunity of escape would have been given to every slave who could make his way to the land of the free. Besides, it would have strengthened our East Indian possessions. England, with her wealth of cultured and Christian influence, would have been supreme in the "Zingian Sea." What a pity that such a grand opportunity was lost !

PRESENT OCCUPANCY BY THE PRINCES OF OMÂN.

I must be brief on the last item, which brings the history of the East African seaboard up to date—I mean the present Arab occupation.

Eighteen years ago Said Barghash, at that time the Sultan of Zanzibar, paid a visit to England. Some of my readers will no doubt remember the event.

Sir Bartle Frere, in a paper written immediately before the Sultan's arrival in this country, says : "Of all the families engaged in the re-establishment of this Arab power [the 'Arab power' in East Africa] none was more energetic or persevering than the 'Al-bu-Said clan . . . of Omân, who, by a mixture of warlike prowess and enterprise with commercial activity, raised themselves from the position of the spiritual rulers of a small province in Eastern Arabia to be the monarchs of two separate and distant kingdoms. It is from this family that the present Sultan of Zanzibar is descended."

The "two separate and distant kingdoms" referred to in the above quotation are Muscat and Zanzibar.

When Dr. Krapf first went out to East Africa, and also when Captain Burton went thither, on his way to explore "the lake regions," Seyyid S'aid was Sultan, being ruler both of Zanzibar and Muscat ; he was the father of the subsequent Sultans of the Zanzibar dominions. After his death Muscat and Zanzibar were divided between two of his sons.

The Rev. S. A. STEINTHAL (Chairman of the Council) addressed the members on "Chicago and the World's Fair," notes of a visit in 1893. Mr. Bramwell had kindly lent a number of books of views, and slides were exhibited by the lantern to illustrate the address.

Mr. C. H. BELLAMY having spoken, Mr. J. BEGG SHAW moved, and Mr. J. HOWARD REED seconded, a vote of thanks to Mr. Steintal for his interesting address and to Mr. Bramwell for the loan of the photographs. Mr. STEINTHAL responded.

The 287th Meeting of the Society, held in the Chamber of Commerce Room, Wednesday, March 21st, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL in the chair.

The minutes of meeting held March 14th (286) were read and approved. Letters and communications were read to the meeting, amongst them being the following :—

Baron Von Mueller, Melbourne, acknowledging his election as a Corresponding Member.

Captain Casati.

Tyneside Geographical Society, with a full report of Lord Roberts' address on his recent visit to Newcastle.

The Commercial Geographical Society of Paris, with proposals for a new building for the Society.

The International Geological Congress to be held in Zurich, 29th August to 2nd September, and invitations to Members to attend the Congress.

Miss H. E. Colenso on events in Zululand.

The Director General of Statistics for Buenos Aires announcing the appointment of the successor of Dr. J. M. Rajis as Director of Statistics.

The President of the Queensland Branch of the Royal Geographical Society of Australia repudiating the claims of Mr. Maiden to be a founder of the Society (see *Journal*, vol. ix., p. 88), and restating the claims of Mr. J. P. Thomson to that honour.

Mr. R. E. Dennett on the action of the Congo Free State in continuation of previous letters.

The Very Rev. L. C. Casartelli, M.A., Ph.D., on the Ushaw paper on "Arctic Discovery."

Mr. C. H. BELLAMY addressed the members on "A Journey Across the Rocky Mountains," illustrating his remarks with a series of lantern views from photographs collected on his recent journey, and a number of maps and diagrams presented by the Denver and Rio Grande Railroad.

Mr. SANDBACH moved, Mr. BENJAMIN O'CONNOR seconded, and Mr. I. W. THOMPSON supported, a vote of thanks to Mr. Bellamy for his address. In responding, Mr. BELLAMY proposed the best thanks of the meeting to the Secretary of the Rio Grande Railway for the maps and views, Mr. B. I. BELISHA seconded, and the resolution was carried.

The 288th Meeting of the Society, held in the Library, Wednesday, March 28th, 1894, at 7-30 p.m., the Rev. S. A. STEINTHAL in the chair.

The death of Commander Cameron having been announced, a letter was directed to be sent to Mrs. Cameron conveying the sympathy and condolence of the Society.

The business of the meeting was to discuss the question of practical Geographical work, local or otherwise, by means of visits to places of interest in the neighbourhood, in other parts of England, and abroad.

The 289th Meeting of the Society, held on board the s.s. *Athlete*, in the Manchester Ship Canal, Saturday, March 31st, 1894.

Nearly two hundred members and friends embarked on the s.s. *Athlete*, at Trafford Wharf, starting shortly after eleven o'clock. Lunch was served on the promenade deck.

The Rev. S. A. STEINTHAL took the chair at three o'clock. Dr. PANKHURST moved a vote of thanks to the Steamship Company, to Mr. T. W. THOMPSON, of Eastham, for the handsome way he had provided for the members, and to the young ladies and others who had attended to the members' comfort. Lieut.-Colonel ROGERS seconded the resolution, which was supported by the Chevalier FROELICH, and carried unanimously. Mr. THOMPSON responded.

After a little delay at Eastham Locks, Liverpool was reached about five o'clock.

THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY

CHICAGO AND THE WORLD'S FAIR NOTES OF A RECENT VISIT.

By the Rev. S. A. STEINTHAL, F.R.G.S., F.I.Inst., Chairman of the Council

[Addressed to the Society, Wednesday March 14th, 1894]

LIKE many American cities, Chicago has a wonderful story, not like a European or Asiatic town taking you back in memory many hundred or even a thousand years, and recalling scenes of ancient times, with monuments of historic interest but startling you with a record of a rapid growth of phenomenal expansion. The west shore of Lake Michigan, where it now stands, was visited towards the end of the 17th century by some French explorers—Joliet and Marquette—but it was not till the beginning of this century, in 1804, that the United States Government built Fort Dearborn to protect the country against the Indians and established a settlement on the swamps, where now Chicago stands. The old story, which we hear of so repeatedly, of Indian massacres was repeated here, for the Indians never gained a victory over their invaders which was not called a massacre, and when they did take possession of Dearborn in 1802 they showed no mercy to the captives they took. The fort was rebuilt in 1814, but there is little heard of the progress of the settlement for some time. In 1837 it was large enough to claim incorporation, having a population of nearly 4,200. By 1850 it had grown to a large city for the west, having already a population of wellnigh 30,000. The swampy nature of the situation was found to militate against health and comfort, and one of those wonderful feats of engineering skill was accomplished by the inhabitants, which startle even Englishmen accustomed to great scientific achievements.

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The whole city was lifted 7ft. with all its buildings. You must remember that they were all wooden buildings, but still it almost seems incredible, and yet is true. This took place in 1855, and with improved health, and, owing to the vast increase of western immigration the trade in grain, had so increased that Chicago numbered 110,000 people, a growth of nearly 106,000 in 18 years. By 1870 it had become the leading city of the west, and with its population of 306,000 rivalled many of its eastern competitors. Many of you will remember how, in the succeeding year, it was almost destroyed by one of the most destructive fires which history records. Three and a half square miles of houses were burned down. The value of what was thus destroyed was estimated at £40,000,000 (\$200,000,000); 100,000 people were left homeless, and perhaps 200 perished in the fire. It must have been an awful sight. Everything was built of wood—houses, churches, public buildings. The streets had wooden side walks, along which the fire flew. It seemed as if the city were destroyed for ever. But the situation of the town was too advantageous, the courage of the people too great to allow them to despair, and soon, instead of a town of wooden structures, a vast pile of stone buildings has arisen, at the size of which we are indeed amazed, for, with a lake front of 22 miles, this great city now covers not less than 181 square miles. Of course this vast space is not all built over. Beautiful parks extend all round, and are connected with one another by magnificent drives, along which are built rich dwellings for the merchant princes of the place. From Lincoln Park in the north, through Wilckera, Humboldt, Garfield, Douglas, Brighton, Morell, Washington Parks, to Jackson's Park in the south, you have a beautiful drive of somewhere about thirty-seven miles. Each park is well laid out and planted with fine trees and beautiful flowers, and fine open spaces for athletic exercise. Some of the devices are more curious than beautiful. These naturally struck me, as a member of the Geographical Society: A terrestrial globe, formed, I suppose, of wire frame work, but filled with variegated flowers, forming a fairly correct representation of the continents and oceans; and a sundial, of which the finger was also made of wire, filled up with plants, the shadow of which fell upon a dial, the numbers of which were made up of various plants. The Boulevards are also worthy of notice, stretching as they do mile after mile through the town, with their tasteful mansions and beautiful gardens opening on the road, with no rails or hedges to separate them from the pathway, and yet suffering nothing from trespassers. And along these drives and parks there flows a constant stream of carriages displaying an amount of wealth and comfort which makes one wonder, when remembering that on this ground less than a century ago the Indians held undisputed sway over swamp and prairie. We pass the

University of Chicago, which lies between Washington and Jackson's Park. It numbers 600 students, and has cost I do not know how much, but it is endowed with \$7,000,000—about £1,400,000—of which sum more than half was given by one man, Mr. Rockefeller. I have in imagination carried you from one end of Chicago to the other, avoiding the business portion of the city, and driving along the smooth avenues over which it is a pleasure to pass. The business portion of the town is not so attractive, though it contains some magnificent buildings. The Board of Trade, corresponding to our Exchange, with a tower 322ft. high, opens its gallery to visitors between half-past nine and one, and you can see an excited scene there, which reminds you of Wall Street or the Paris Stock Exchange, though the men you see in such wild uproar deal in corn and meat and not in shares. There is in Randolph Street a huge building, the City Hall and County Court-house. Indeed, many very fine edifices can be seen in this neighbourhood. At the corner where it intersects State Street stands the Masonic Temple, the tallest even of Chicago's tall buildings, towering up 21 stories, but making, as it seems to me, not the slightest pretence to anything like beauty. The Auditorium, however, I cannot help admiring, though it is also one of the edifices which rises so high that its observatory is almost as lofty as the Manchester Town Hall, being no less than 260ft. high. The hoist takes you to the seventeenth story, and then you only have a few stairs to mount. The view from the top is magnificent. You have the vast city with its parks and rivers stretched out before you, and the lake extending as far as your eye can see with its many steamers and sailing vessels enlivening the broad expanse. When I was there last autumn you could see the Exhibition buildings some six miles away, and at night the view of these illuminated repaid the ascent. The Auditorium is a wonderful building. Its massive grandeur gives it a stateliness notwithstanding its immense height. Its frontage towards the lake on Michigan Avenue is somewhere about 350ft., and it stands on two sides of Congress Street, stretching along it no less than 360ft. It is one of the largest even of American hotels, the part on the north side of Congress Street being conducted on the American plan of charging for board and lodging; the other half, on the south side, on the English plan of charging you so much a day for your room, and letting you pay in addition for what you consume. It is magnificently fitted up, with every imaginable convenience. I have never seen anything more beautiful than the electric lighting of the dining-room, which is on the tenth floor, and in daytime gives you a very fine outlook over the lake. In the same building is the Auditorium Theatre, with 4,100 seats, most comfortably arranged, and the whole decorated in truly excellent taste.

Last autumn, when I was there, this theatre was crowded every night, Sundays not excepted, to see a grand spectacle in honour of the four hundredth anniversary of Columbus' great discovery. Nearly opposite the Auditorium is the Arts' Building, which was used during the Exhibition time for the incessant Congresses which were held in Chicago. I think it would require a very ingenious mind to discover any debateable topic of general human interest in which a Congress was not held last year at Chicago. Temperance and Peace, Education, Music, Labour, Engineering, Geography, Philology, Electricity, Women's Questions, Medicine, and I know not what besides, all were discussed, and the one Congress to which I had the honour of being delegated certainly, in some respects, surpassed all others in the grandeur of its conception and the merit of its achievement. It was the Congress of Religions. At it, I think I may say, every form of civilized religious belief was represented of which you ever heard, and many whose acquaintance you only made on looking through the list of representatives gathered at the Parliament. It was one of the most wonderful meetings the world has ever seen. Catholics, and Protestants of all denominations, Jainists, Buddhists of the most varied kind, followers of Confucius, Hindoos of very varied creed, upholders of Shintoism, Mahommedans, Jews, Parsees, Armenians, Greeks, all met together in the most friendly manner to explain the various ways in which they sought the higher life, and I believe only on two occasions was there anything like an approach to anything like discord. Side by side with the general gathering at which all these varied religionists met upon a common platform, each community had its own special conference, at which its own detailed and peculiar work could be discussed and explained. I have not heard that anyone who attended this conference was converted by so doing to a new faith, but I feel convinced that very many learned to respect men holding different faiths as they had never done before, and will entertain kindlier opinions of others than they had ever done. It is one of the rare experiences I brought with me from Chicago that has made my journey a very precious one to me.

I have not yet done more than name the existence of that great Exhibition, which made Chicago the object of the world's wonder last year, and that only when I mentioned how from the Auditorium's observatory we could see its buildings in the far away distance I really shrink from speaking of it, so deeply do I feel that no words of mine can do it justice. I knew, of course, that I was going to see an Exhibition of immense size. The United States pride themselves on the magnificent scale on which they do everything. The great Paris Exhibition of 1889 occupied the space of 173 acres, and of this 23½ acres were covered by buildings. Our London Exhibition of 1862 covered 23½ acres

also with buildings. One of the Chicago buildings, that devoted to Manufactures and the Liberal Arts, exceeded either of these, covering 30 acres by itself, and there were fifty other buildings in addition. The whole space occupied was 645 acres, and of this 159 acres were covered with buildings. To give you some standard by which to judge what these figures mean, let me repeat that one building—that devoted to Manufactures and Liberal Arts—covered 30.5 acres. Our Queen's Park in Manchester covers 30 acres, just half an acre less than the immense building I have named. But the size of the Exhibition was a small thing as far as the impression it made in comparison with the wonderful beauty of the whole, and the lovely harmony and grace which made it a picture never to be forgotten. I had never dreamed that the United States could have produced such a grand triumph of artistic grace and loveliness. Each building had been designed by different architects, while the whole ground was laid out by the practised hand of Mr. Olmstead. But I own to feeling, as time went on, and my impressions became more clear, that it was incomprehensible how so many minds, acting as they did independently, succeeded in producing so wonderful an effect of harmony and grace. The general effect was that the buildings were of marble; of course one knew that they were but stucco, but the work was done so well that, even in the sunlight, they looked as if of solid stone, and every statue and every ornament seemed to be the result of one united and artistic plan. When, at night, the electric light of the illuminations brought out each line and every detail, the effect was exquisite beyond description, and sailing on the Lagoons in the electric launches made one think oneself transported into fairy-land. You have, in the pictures which are circulating through the room, as fair a representation as you can receive by photograph of what I saw; and you can imagine, therefore, that I am not speaking in too strong terms when I say that the citizens of Chicago may well be proud of their Exhibition, and all the States rejoice that their sons and daughters could create so grand and beautiful a scene. I shall have thrown upon the screen directly some of the buildings and can then speak of them again, but I must say at once I had no time to visit the interior and examine the vast exhibits gathered there: I only wandered round enjoying the loveliness of the view of the buildings, the exquisite charm of the gardens and the islands, groaning in spirit that I had not months instead of days to spend among them. I must, however, not pass without remark that wonderful addition to the Exhibition—the midway plaisance—the broad avenue which connects Jackson and Washington Parks. In it are collected a varied mass of ethnological exhibitions. There are villages of South Sea Islanders, natives of Dahomey, Laplanders, Red Indians, and other uncivilised tribes, but not only are savage

races represented, Japan and Egypt, Germany, Ireland, &c., all send specimens of their architecture, and show their modes of life. You can ride a camel in the streets of Cairo, or listen to a military band in a German beer garden, or have a cup of tea in a Japanese tea garden. It is a strange gathering of the nations—even more complete than the celebrated one at the Paris Exhibition. Then there is the Ferris Wheel, a more wonderful engineering feat than even the Eifel Tower. Besides these sights the midway plaisance offers all manner of amusements, menageries, and conjuring exhibitions, café chantants, and shows of all kinds. A strange bewildering scene; but the crowds who throng the exhibitions are perhaps more interesting even than the sights they see. From all parts of the world, from East and West, from North and South, all come together to bear witness to the attractive power of Chicago, the chief city of the great West.

The Surface Water of the Sahara.—Dr. Gerhard Rohlfs, the well-known African explorer, gives very valuable information (*Zeitschrift* of the Geographical Society, Berlin, 1893, vol. xxviii. heft 4) as to the origin of the water which comes to the surface in many parts of the Sahara. The rainfall in this great desert is on the whole very scanty, and there are localities in which it does not rain for years. Yet even in such districts oases with perennial wells and springs are by no means rare. In explanation of this singular fact Rohlfs correctly points out the very great importance of Dr. Nachtigal's discovery of the Bahr-el-Ghazal, which in former times was an outflow of Lake Chad towards the north-east, and in connection with which even now large quantities of underground water flow in the direction of the great desert, providing such widely extended regions of the Southern Sahara as Egei, Bodele, and Borku with a plentiful supply of water. Rohlfs finds that the northern boundary-line of the tropical rains of the Central Sudan regions runs from the oasis of Air to the Belkashiferi well (Bilma-Chad route), and from there along the northern boundaries of Wadai, Darfur, and Kordofan; and he gives reasons for concluding that many of the oases north of this line derive their underground water supply from the Sudan, as the Bahr-el-Ghazal districts do. The oases of the Northern Sahara, Tafilet, Tuat, Rhadames, Fezzan, Aujila, and many others, obtain most of their water from the neighbouring mountain ranges. Rohlfs shows that the western oases depend in this respect chiefly on the Atlas range, whilst the oases more to the east derive their water from the Hogar Mountains, the Jebul Nefus, and J. Soda, and the Libyan coast plateaux. Moreover, it follows from Duveyrier's observations that various parts of the Northern Sahara have more rainfall than is generally assumed. About the oases to the west of the Nile, viz., Chargeh, Dakhel, etc., Rohlfs is not prepared to say whether they are in any connection with the Nile or not. To decide this important question he recommends comparisons between the different levels of the wells and springs of the oases in question, and the rise and fall of the Nile. There remain those oases that are situated in the very centre of the great desert, such as Bilmar, Kawar, Wanjanga, Kufra, and others. We have at present not sufficient data to give a satisfactory explanation of the origin of their water. Rohlfs has found certain indications which render it possible that Kawar derives its water from Tibesti; but to suggest, as he does, that Kufra (Kebabo), which is situated in 24° 30' N., Lat., derives its water from the Sudan by some peculiar process of suction, is a mere hypothetical assumption which seems hardly justifiable in face of the fact that Kebabo lies 500ft. higher than the Sudan territories round Lake Chad. Rohlfs correctly emphasises the great meteorological importance of mountains and plateaux, like those of Tibesti, Air, and Hogar, and it is not impossible that similar orographical features exist in the entirely unknown eastern territories of the Central Sahara, and if such be the case the enigmatical appearance of water in the surrounding districts would be easy of explanation.—*Proceedings, Royal Geographical Society, March, 1894.*

THE JAPANESE AND CHINESE OAK-SILK SPINNER: THEIR
LIFE AND CULTIVATION (ATTACUS JAMA-MÂI AND
BOMBYX PERNYI).

By Mr. L. NORTH-SZIGETVÁRY, of Newchwang. Based upon the work of the Rev. William Netz, Dierdorf, Neuwied, Germany. With additions from personal observations by the Author.*

[Read to the Society, in the Library, January 10th, 1894.]

GENERAL REMARKS.

ATTACUS JAMA-MÂI lives wild in Japan, in Kiushiu, and the interior of Nippon; and Bombyx Pernyi in North China and Manchuria. A moist climate, with a temperature of 59° to 65° F., is the most suitable for the proper rearing of these insects.

A few eggs of Jama-Mâi were first sent to Europe in 1861 by M. Duchesne de Bellecourt, French Envoy in Japan, to the Imperial Acclimatisation Society in Paris, who, unfortunately, were ignorant of the proper food necessary to sustain these caterpillars, in consequence of which they all perished. Then M. Pompe Van Meerderwoort, a Dutch naval officer, on learning the name of the food of these oak-silk-worms, sent another batch of eggs to the same society. Bombyx Pernyi, however, was not brought to Europe until 1870, by Baron Eugen von Ransonnnett, member of the Austrian Expedition into Eastern waters. As far as present experience shows, a moist and cold climate like that of the greater part of England, and a dry and warm climate like that usually found in the South of France, is unsuitable for the caterpillars. The rearing in cold districts should begin in a spare room of the house, with open windows. If the thermometer, however, rises to and above 73° F., it will be necessary to lower the temperature of the room by the use of a vaporiser.

I.—THE LIFE IN THE EGG.

The eggs of the moths consist of a leathery shell, on the inside of which lies the delicate epidermis of the yolk. This incloses a clear fluid, in which swim small globules and one vesicle of semen constituting the yolk. The form of healthy and hatchable eggs is rounded, not depressed; the surface is smooth and generally marbled, some, particularly the last laid, are white, the first laid are brown, but very soon assume a grey colour. Their size is that of hemp seed. The barren eggs are depressed. Only the impregnated eggs are hatchable, of which 120 weigh 15 grains troy.

In the wild state the female moths attach their eggs by means of a gummy substance to protected parts of the oak, in order that the young worms may find their

* Mr. Szigetváry has sent to the Society, to illustrate this paper, a cocoon of each variety of these silk-producing moths, which may be seen in the Library. The photograph gives the exact size of the cocoons.

food as soon as hatched. The cultivator should endeavour to obtain as many eggs as possible, for his future harvest depends on them. For this purpose he should make a gauze-covered cage of the dimensions of one cubic yard, in which the cocoons ought to be laid side by side, not one above the other, in order that the emerged moths shall find themselves forced to deposit their eggs on the sides of the cage as soon as they are ready. Of course the eggs must not remain in the cage. As soon as the laying time is over, the eggs, having been previously moistened with a vaporiser, should be taken off carefully with the fingers, not sooner, however, than twenty-four hours after the last of the eggs have been laid. They should be carefully separated from one another* and placed in a small box, in which they should be taken to the place where the young worms on emerging may find their food. An extempore vaporiser can be made by means of a clean brush dipped into clean water, when by stroking the bristles with the fingers the minute particles of water are forced to fly in any given direction. Sixty moths will find sufficient room in a cage one cubic yard in dimension. The frame work should be made of twelve pieces of wood, covered with gauze. On one side a door-like flap should be left, so that the cocoons may be placed therein and the eggs taken out. The flap can be closed with pins.

Bombyx Pernyi, which remains in the cocoon during the winter, should be placed in the cage at the end of April. *Jama-Mâi*, which remains in the egg during the winter, should be placed in the cage from the middle to the end of July. The eggs of the latter may remain in the cage until the middle of February, but the cage must be kept in a very cool place free from mildew. If preferred, however, the eggs, after having been properly dried, may be collected and put in a wooden box protected from wet and mice, &c., and should be placed on the north side of the house in the open air, as they will stand all degrees of cold while in the egg. Only in the spring, when the air is mild, keep the eggs cold as long as possible, as very little warmth suffices to hatch them, or else the cultivator will run the risk of not having sufficient food for the young worms at the right time. In this way the cultivator may gather two harvests of eggs in the same cage—first of *Bombyx Pernyi*, then of *Jama-Mâi*. Before the young caterpillars come forth (*Jama-Mâi* leaves the egg from the end of April until the middle of May, and *Bombyx Pernyi* two or three weeks after the eggs are laid), and, according to the temperature, the eggs are placed in a small gauze bag with a wide open mouth on top, among the leafy branches of the oak, in such a manner that one bends a suitable branch into the bag. For cultivation in the open-air receptacles made of very finely-woven wire gauze are preferable, on account of rain and wind, as they can be fastened to the branches with wire. The layer of eggs in the small bags or wire-gauze receptacles must not exceed one-half inch in thickness, *i.e.*, in height.

Eggs may be procured from the cultivators at a price for 15 grains troy of *Jama-Mâi* eggs from two to three shillings, and of *Bombyx Pernyi* from one shilling to one shilling and sixpence. They are very easily sent through the post in small bags, as they are very solid. *Jama-Mâi* eggs are despatched during the winter months, those of the *Bombyx Pernyi* during the few days that intervene between the laying and their forthcoming.

II.—THE CATERPILLAR.

Out of the egg, through the inducement of congenial warmth, emerges the caterpillar (oak-silkworm). Every caterpillar consists exclusive of the horny head

* Because, as a rule, they are laid and gummed together in clusters, whereby the eggs contained in the centre would be prevented from being hatched.

of twelve fleshy joints (rings), each of the three foremost of which carries one pair of horny articulated, tapering breast—or neck—feet. On the end of the body two fleshy unarticulated feet are situated so as to point backwards, and are called the after-pushers. Between the latter and the former are, furthermore, placed eight short feet on the belly. The head has fully-developed, gnawing mouth-organs; in the lower corner, on each side of the head, are several eyes, and before them a composite antennæ in which are recognised the organs of smell and feeling. While eating they ride on the edge of the leaf, as they eat the leaves at the edges and do not bore holes through them. On the full-grown caterpillar nine air-holes on each side of the body are easily recognised; these serve as breathing organs. During four moulting-sleeps (stupors) they change colour rather than form, and in nine to eleven weeks (according to the weather) the caterpillars advance to the chrysalis state.

The young caterpillars possess in their first life-period a blackish skin, and both species may be cultivated advantageously on living trees, the crowns of which are enveloped with gauze; the bottom of the gauze must be fastened on the stem below. This covering, however, should be so arranged that one part of it may be opened and closed at pleasure.

The cultivation on living trees, whether they are in tubs in a room or outside in the open, offers to the cultivator many advantages. First, such food is far healthier and more nourishing for the worms; then the young leaves are very tender and would, on being cut, very soon become withered; consequently one would have to renew the oak branches every day, which proceeding is very troublesome. Not only this, however, but by the constant change of the leaves many young worms would be lost, as, owing to their diminutive size, they would be overlooked and thrown away, especially those that are in their first stupor. Considering that the young worms require very little food in their first life-period for their development, it is most advisable that they should be brought up on living trees. For the cultivation of Jama-Mâi, which emerges from the egg about the end of April, there should be provided plants, late in autumn to the middle or end of November, in suitable tubs, oaks with a luxurious crown and about the height of a man, and they should remain in the open until the middle of February. It is understood, of course, by suitable winter weather, that this work may be done in the middle of winter. The safest plan is to bury the tubs in the ground as a protection against hard frost. In February they are brought to the sunny windows of a heated room with pure fresh air, not contaminated with tobacco smoke, etc., and the tub-oaks will bear fully-formed leaves in four to six weeks' time. Before these oaks with foliage are used, it is advisable to wash off all the dust that may have gathered on the leaves, or else place them out in the rain to be cleansed. According to the size of the crown of the tub-oaks, the worms are of such small size in their first life-period that from two to four hundred of them may find food. Experience has shown that the young worms are great wanderers; the gauze cover of the crown prevents them from straying far, and those who may have fallen from the leaves may find their food again by their own exertion.

Should the temperature be above 66° F., it will be advisable to moisten the worms with a vaporiser daily at noon. Through the influence of air and food the young worms will grow rapidly for about ten days, then they fall into their first stupor. At this time, during the cultivation of Jama-Mâi, should frost be expected at nights, the windows must of course be closed and the room heated a little. At other times it is most advisable to have the windows open. The length of the worms that have fallen into their first stupor is about half an inch. The second life-period of the worm lasts about nine days; then they fall into a stupor lasting about three days, according to the weather.

Now we are in a part of the year, about the 20th May, when ordinarily frost at night may not be expected. Hence a few worms may be brought experimentally and placed on planted oak hedges in the open, provided that they possess an abundant foliage in which the insects may find sufficient protection from great heat, cold winds, and continuous rain; or else they are placed on oak trees which must, however, be enveloped with a covering of gauze as a protection against birds. Should one possess oak hedges or oak trees, then the young worms are cultivated on cut oak branches, which are placed in water jars or wide-necked bottles, filled with water; care must be observed, however, that the ends of the oak branches are well immersed in the water, and that the jars or bottles are well closed at the neck with paper in order that the young worms, who are great lovers of water, may not crawl into it and be drowned. The branches ought to be as long as possible, in order that the leaves may not absorb too much water from the jars, and in consequence give the worms diarrhoea. If the branches are kept from the scorching heat of noonday they keep fresh for some days, and are, especially when cut from old large-leaved oaks, excellent food.

After the third stupor the worms are about 1.35in. long. They eat for a further period of ten to eleven days and then sleep two and a half to three days, according to the state of the weather. The weather is now amply warm in the open, and the worms may be placed without hesitation in the open air, always provided that one possesses a full-leaved oak hedge, for it may happen that, owing to the insufficiency of leaves as a protection from continuous rain, such worms as are in their moulting sleep perish.

The windows must be kept open day and night. The transport of the worms from one tree to another, or from one branch to another, is managed either by placing jars with fresh branches between those containing old ones, in order that the worms may of their own accord change their quarters, or else cut off leaves or branches on which worms may be sitting with a pair of scissors, and simply place these detached leaves or branches among or on the top of fresh supplies of food; the leaves may also be fastened with pins. *On no consideration whatever should worms be taken away forcibly from the place which they may occupy, except only from perfectly smooth or polished surfaces; to remove, especially, those that are in their stupor would infallibly cause their death*, as they cannot deposit their old skin in the moulting process on the point on which they have secured themselves. To be safe in having a *healthy after-cultivation*, it is advisable to keep the worms during all their coming life-periods in the open and cultivate the same on living trees or oak hedges, for which proportionally few trees or small patches of hedges are required.

To be able to carry on the cultivation of the oak-silkworm on a large scale it is necessary to possess suitable rows of planted hedges, when, after having brought the worms into the open, there will be very little further trouble, as there will be no more work to do except the pleasant one of harvesting the cocoons.

In the fourth life-period the worms measure 1.75in.; the duration of this period is about thirteen days and the following stupor four days. From now the insects eat about ten-fold of the previous amount of food.

It is self-evident that the cultivation of the worms in the open may only be carried on successfully in case they are there fully protected against their enemies. In their first life-periods, ants, spiders, and perhaps also earwigs, are dangerous to them as they attack the young worms in their stupors, but in all life-periods birds, great and small, are their greatest destroyers. A protection from these enemies is achieved, in the first place, by carefully examining the soil of the hedge plantations and by removing all breeding places of other insects, and again by completely enveloping the planted hedges with netting, in order to keep away the birds: or else to

do, as in China and Japan, where whole villages combine, and through personally guarding them, rattling and shooting, to scare away the birds. The netting* enveloping the hedge plants must be at least two yards high, so that one may easily walk underneath, and so that all parts of the hedge may be reached.

According to the size of the meshes and strength of the yarn, one square-yard costs three to five pence; the chemical preparation costs four pence per pound. By an outlay of forty to fifty shillings, a hedge plantation of two hundred oaks, of two yards in height, may be completely covered with a prepared net.

The most practicable way of planting an oak hedge is to plant every year, in November, eight to ten year old oak treelets, not too near a dusty highway, on each side of a path of one yard in width, every three or four as close as possible. The length of the hedge-work depends, of course, on the extent of the cultivation desired. It is calculated that about ten caterpillars will find sufficient food for their full development in a cubic yard of luxurious foliage. Jama-Mai will consume the first shooting leaves, Bombyx Pernyi worms the midsummer ones. Every spring the trees should be pruned thoroughly, so that they may produce as much foliage as possible and that they may not grow too high. Should the ground be suitable no manure is required as the excrement of the worms is an excellent fertiliser in itself.

Caterpillars in a room are cultivated most advantageously in the following way: With the new oak branches they should receive a fresh supply of water in the jars every time. Worms of the same life-period should be brought on the same jars, so that all worms in their stupor may be on the same jars. Furthermore, one should see that the worms are distributed about equally on the new branches, and consequently eat the greatest amount of leaves; especially at the beginning of their spinning-time they should be supplied with at least double the amount of leaf usually consumed. Should hot dry weather occur the full-grown worms must be sprinkled twice daily, at noon and evening, with a vaporiser. If cultivating on a large scale they should be thoroughly wetted with a pulverizator, as the oak-silkworms are great lovers of shadow, coolness, and moisture. In this life-period the insect grows most; they triple their weight, and eat three times as much as in the three preceding periods. Finally, they pass into the fourth and last stupor. The length then is 3.9 in. to 5.9 in. and about the thickness of the finger. The duration of this last life-period is from sixteen to eighteen days, according to the state of the weather. This fourth stupor is the most critical of all. When the caterpillar has passed his term happily and has thrown off the old garment, it remains in quietude for some time without eating anything. This state lasts from twelve to twenty-four hours, and its outer skin becomes firm. The healthy worms evince now the greatest appetite; at this period of eating they prepare their silk stuff and may live on different kinds of leaves, such as birch, walnut, or maple leaves, without hindrance to the spinning of their cocoons—an experiment, of course, that may well be left untried with worms that are designed for after-cultivation. Having eaten enough the worm alters its colour visibly. While previously it possessed a splendid garment of an emerald green, with some blue dots, and several silvery shields, its colour now becomes similar to ripe grapes. The caterpillar is now also restless, crawls backward and forward until it finds a satisfactory place in which to spin. Before beginning to spin, however, the Jama-Mai excretes a brownish fluid and the Bombyx Pernyi a somewhat lighter one. This excretion is in order to cleanse themselves of any impurities they may have had within them. This is the only liquid that healthy caterpillars part with during their

* Such netting is made, in all required sizes, by G. Schröder, net manufacturer, in Landsberg a. d. Warthe; they are chemically prepared, and made weather-proof and undecayable by Otto Hiller, neue Friedrichstrasse, Berlin.

whole life; at all other times their evacuation is dry and solid. After this cleansing they gather, with wonderful skill, several leaves together and spin their cocoons in the enclosed space, but with the precaution that the cocoon may not perhaps later fall on to the ground with the falling leaves in autumn. Now the precaution must be taken that such spinning worms may not be disturbed in their work by still eating worms, *i.e.* that the latter may not demolish the supports of the basket-work of the spinning worm, otherwise the spinning worm would fall from its height and injure itself. In such cases all worms attacking the spinning worm's work should be removed at all hazards. In about three days, by day and night continued work, the caterpillar has finished its cocoon; then it rests and changes itself, in from eight to ten days, into the chrysalis; hence caution must be observed *not to remove the cocoon with the chrysalis from its place sooner.*

III.—THE LIFE IN THE COCOON.

The full-grown caterpillars of the oak-spinner make with their fine spinning organs an oval cocoon, the filament of which is from twelve to fourteen hundred yards in length. The outer colour of the cocoon, which, when reeled, supplies the raw silk, is by *Jama-Mâi* olive-green-yellow; by *Bombyx Pernyi*, brownish, or pale citron yellow. The single filament is lustrous, elastic, and of greater strength than that produced by the mulberry spinner. The dyeing and weaving of the filament of both is done without difficulty. Concerning the reeling of *Jama-Mâi*, it is easily managed. The gum which holds the filament together is a little more abundant than that of the mulberry spinner; still it softens sufficiently, so far that the reeling proceeds easily, if the cocoons are placed in rain water for one hour before being wound off. The advantage of this filament in the reeling consists in the fact that it breaks far more rarely than that of the mulberry spinner. And while the outer layer of the cocoon is olive-green yellow, the inner one is finer and of a lustrous silver-white colour, and so are obtained at the reeling two sorts of shiny silk.

The *Bombyx Pernyi* silk-spinner produces an extraordinarily beautiful, fine, strong, and lustrous silk; the fineness of the filament, on being well reeled, is more marked than that of the *Jama-Mâi*, but the gum which unites the filament is more indissoluble; and if care is not taken by the precaution of boiling the cocoons over a strong fire for a good hour, the filament will, as long as the gum is insufficiently softened, be retarded during the reeling and break very often. The cocoon is very rich in silk. To dissolve the gum with more certainty the cocoons may be boiled for one hour in water to which borax has been added. Three parts of borax to one hundred parts of water will cause the winding to proceed satisfactorily.

When the cocoons are from eight to ten days old the *Jama-Mâi* may be taken (as in July-August the moth emerges) into the above-described gauze cage, which will be best if placed *in the open*, and lay them side by side and not on the top of one another. Above the cage one must erect a protecting roof against rain, as the moths would be injured through it. The cage must, furthermore, be protected against the *attack of cats*, as the feline tribe believe the moths to be great birds, and therefore lawful prey. The open atmosphere is more healthy, in so far as the emerged moths' wings dry better in the open air, *which drying ought to take place within an hour after the emerging*, otherwise they become crippled moths. *Bombyx Pernyi* cocoons, which are spun during August until the middle of September, are gathered also eight to ten days after spinning, and are *wintered in their cocoons*. They should be kept in a cool place which is free from frost, for instance, an unheated room free from frost, or in a cellar, where the cocoons must be placed on a shelf side by side, and on

no account on top of one another. A further precaution must be taken to ensure the safety of the cocoons from rats, mice, &c. Such cellars must have the purest air possible, and those in which wine is fermenting, &c., ought to be avoided. Even cool temperature of the place of wintering the cocoons is necessary, so that the Bombyx Pernyi may not emerge in the autumn of the year in which it has been born, as a second generation would either give miserable cocoons or else be a total failure, the leaves in autumn being indigestible for the young worms. *The finest cocoons are chosen for future cultivation, and also male and female in as even a number as possible.* The male cocoons are more pointed and lighter, the females rounder and heavier. Bombyx Pernyi, which have passed the winter in the cocoons, are placed at the end of April in the gauze cage, which should, however, be hung up in a sunny room with open windows, as the weather at this time of the year does not permit the placing of the cage in the open.

Cocoons destined for the market are killed ten days after spinning, by being placed either in a hot oven or in boiling water. The cocoons which are pierced by the emerged moths are also collected, but as they only supply the floss-silk are of less value.*

IV.—THE MOTH.

Out of the cocoon of both oak-spinners a moth emerges in the evening between five and seven o'clock—as the moth of both spinners is nocturnal. The stately, beautifully coloured insect comes into its new existence, after having forced itself through one end of the cocoon, which it has previously softened with a corrosive fluid. This handsome moth is about 5·80 inches from tip to tip of the wings, the colour being at times brownish, at other times bright yellow, at times also dark brown, with the edges of the wings marked with white and black colouring, and having on each wing a transparent mother-of-pearl eye, which is encircled by a white, a black, or a pink line. The male has a pointed abdomen, while that of the female is rounded. After coming together the female lays with a special organ from one hundred and twenty to one hundred and forty eggs. The male and female die soon after having performed their life-function. In hot and dry weather one places a piece of damp turf on a plate into the cage. Other food or other manipulation on the part of the cultivator they do not require.

The following are excerpts from the report called for by Sir (now Baronet) Robert Hart, Inspector General of the Imperial Maritime Customs of China, and furnished by Mr. Commissioner J. Alex. Man, of Yingtzü, Newchwang, dated 1st November, 1880. The whole report may be found in the Customs publication, "Silk," II. Special Series, No. 3 :—

" . . . The kind of raw silk produced, for purposes of export, in Shengking (the province of Manchuria, in which Yingtzu is situated), is limited to that reeled from the cocoons of the worm fed on the leaves of the oak tree known as *Quercus Mongolica*, or *Quercus robur*. This worm is the Bombyx Pernyi, or Bombyx Fantoni of Italy. . . . The usual way of killing the chrysalis is by steaming them. The cocoons are placed in small baskets, about 2,500 in each, and then held over pans of boiling water. Care is taken to kill the chrysalis without injuring the silk. Reeling can at once take place after this is accomplished ; but if the cocoons are allowed to

* These cocoons are at present bought by Vve. Simon, née de Tuisseau, Bruxelles, Rue de l'Ascension, No. 14 ; and Jama-Mai by Mr. Hesse, silk manufacturer, Berlin, who give an average price of 2½d. per cocoon. This price, of course, is paid for cocoons which are not pierced.

remain until they become dry, it is necessary to dissolve the agglutinated mass of silk in warm water before it is possible to unwind it.

" . . . There is a black sort of silk produced in the neighbourhood of Kaichow. From enquiries which I have made from the Chinese concerning it, I am told that it is spun by the worm *Bombyx Pernyi*, which contracts a habit of devouring, not only the leaf of the oak shrub, but also its petiole, ribs, and veins. The result of this is that the body of the worm and the silk it produces become black.

" . . . To find the probable silk out-turn of a quantity of cocoons, the natives reckon by number, and not by weight as in Europe. So likewise with the eggs and chrysalis; three-fourths of the former and one-half of the latter, if ultimately yielding cocoons, would be considered a good crop. There are many bad eggs in a lot, and the deaths among young worms are considerable.

" . . . The natives pick out the most promising-looking cocoons, and either sell or keep them for breeding purposes.

" . . . The distinguishing features between the male and female cocoons are—in the former, both ends are pointed, and the envelopes stronger but smaller than those of the female; the latter are thicker, almost round, and comparatively soft. The largest cocoons are generally over 5 centimetres in length and 3 centimetres in diameter after they are divested of their floss silk.

" Wild silkworms in this province are bivoltini. Two crops of silk are derived from them in the year, called by Chinese 'ch'un,' or spring, and 'ch'in,' or autumn crop. The first is spun by the larvæ hatched about April-May from the eggs of moths, the pupæ of which have remained undeveloped in their cocoons throughout the winter months from the previous autumn, and from which they make their escape in the butterfly shape as soon as the sun has gained sufficient power to affect the chrysalis. The second is obtained from the worms of eggs hatched in July. The moths which lay them are from the chrysalis of the spring crop, which, without interference, burst forth from their temporary prisons about fifteen days after spinning has ceased—say, early in July—assume the imago state, and lay the eggs from which the silkworm is hatched ten days later.

" To preserve the cocoons through the winter months they are placed in baskets and hung up, facing the south, in the dwelling-houses. They are thus sheltered from the bitter north winds which prevail during the winter, and derive the benefit of the sun in that season when the sky is nearly cloudless for about three weeks out of every month. Besides this, in each room is a brick oven, built for the purpose of heating it. At night this 'k'ang' is used as a bed to sleep upon, and during the day serves as a seat and table combined. Inside there is a flue, and at one end an opening in which a fire of millet stalks is generally kept.

" Notwithstanding, however, the heat which proceeds from this, the temperature of a native house in the mountains of the silk regions must be, during the greater part of the winter, many degrees below freezing point.

" The Chinese say that the chrysalis could doubtless stand the winter even if left exposed, as formed, on the bushes, the worm being indigenous to these parts. But, putting aside the destruction which wild animals, birds, and reptiles would be likely to cause, it is running a great risk, for nights exceptionally cold would most probably allow none but the strongest to survive the winter, the weak ones succumbing to the cold.

" The eclosion of the aurelia from the cocoon usually takes place between 4 p.m. and night. It is effected without the breaking of even a single thread, by the moth ejecting an acid secretion, which dissolves the gluten, at the end of the cocoon corresponding to its head. The moth then forces its head out, and finally emerges.

"The males and females are separately placed at first in bell or circular-shaped baskets of 100 in each, to allow their wings to dry before coming together. After this their contents are thrown together for a period of 12 to 20 hours, when the males are discarded and the females put in covered baskets by themselves. This process is dispensed with in the autumn because of the warmer weather, and, instead, the moths are placed on the leaves of cut branches hanging up in the houses. A thread is attached to their wings and these branches, on the leaves of which they lay their eggs.

"It is the common practice to put together those of each sex who emerge on the same day, as the eggs are then considered to be better.

"About four or five days after impregnation has taken place the females lay their eggs, in the spring, on thin paper or cloth placed on mats, &c., for the purpose; in the autumn, on leaves as before stated. This operation lasts about four days, the average number of eggs laid by each female being estimated at from 200 to 300; but instances are known of a good moth excluding as many as 550. The females then die. The best eggs are those which are laid on the first two days.

"After about six days' exposure to the air from each egg comes forth a small black worm, not unlike an ant in size and appearance. This is the worm in its first stage. It is at once transferred to the leaves of the young oak shrub shoots, which have been previously forced by lopping and placing in cold water. After feeding on these leaves for a few days, and when nearly an inch long, the worm is removed to the most tender-leaved oak shrubs on the sides of the hills. Rain at this stage does not affect it injuriously. The greatest enemies are centipedes, birds, &c. The natives, to ward these off, frequently discharge guns and fire-crackers, and make a noise by beating on a hollow bamboo.

"Another plan, often adopted when the worms are just hatched, is to put seventy or eighty of them on the leaf-bearing shoots of the oak shrub which spring from the roots of the tree after it has been cut down close to the ground. The number of bushes on a given space now serves as the basis of a calculation for the extent of breeding.

"After the lapse of five days from the time the larva is hatched, its first 'mute' or 'sleep' occurs. Immediately afterwards it casts its skin. The worm has hitherto been black, but it now assumes, and maintains almost to the last, a bright green colour, and rapidly increases in size. Generally, the spring worm undergoes altogether four mutes, and the autumn one five; but if it happens that the former sheds its skin five times, the latter will then do so but four. The year's worms have thus a total of nine sleeps or mutes. Each sleep occupies from one to two days, according to the state of the weather.

"The second mute occurs about the 12th day, the third about the 23rd, the fourth about the 32nd, and the fifth about the 46th day after hatching. The average time necessary for a worm to arrive at maturity, counting from the date of hatching till it prepares to spin the cocoon, is from 46 to 60 days. There is, however, often a difference of ten days, sooner or later, in the existence of the worms.

"In autumn the period of arriving at maturity is longer by 20 to 30 days.

"On the approach of each stage, when the worm is about to change its skin, it ceases eating, erects the fore-part of its body, and remains asleep in this position until the new skin is sufficiently perfect to enable the caterpillar to wriggle out of its old one. This is a critical time and often proves fatal, for, should the worm be unable to clear the last segment of its body of the old skin it will probably die.

"On completion of each sleep its appetite increases greatly. After recovery from the last sleep—fourth or fifth, as it may happen—it devours the leaves most greedily.

In the course of the next ten days the worm, which is full-grown and about 3in. to 4in. long, now commences to spin its cocoon. This is done by taking two or three leaves facing each other of the tree it is feeding on, and joining them by drawing the threads of silk (which issue from its mouth) from and fixing them to various points about the leaves, and forming them in the shape of a capsule, into which it drops and speedily becomes enclosed in a network of its own silk threads.

"This outer silk is called floss, and is usually made into wadding. The inner and more dense kind forms the hard skin-like substance of the cocoon, which has to be boiled in an alkaline solution before reeling can be effected. Spinning takes about five days to complete. The worm then becomes torpid, passes from the larvæ and appears in the pupa or second stage, *i.e.*, in the third form of insect transformation. After remaining thus for (if the production of the spring crop worm) about three weeks (and, if the production of the autumn crop worm, throughout the winter), it then emerges from the aurelia, and takes the imago or moth state, the last and perfected period of its existence. The processes already described are subsequently repeated.

"The disease amongst the worms in Japan, occasioned by the 'uji,' is very rarely met with in these parts. The insect so named perforates with its ovipositor the bodies of the caterpillars, and deposits in them its eggs, which latter produce parasitic larvæ. These reside like intestinal worms within the bodies of the grubs, feeding only upon the fatty matter, and carefully avoiding the vital organs. These parasites, as soon as they attain full size, assume the pupa state, pierce the skins of their victims and come forth. This 'uji' probably belongs to the genus of insects known to European naturalists as ichneumon.

"Other diseases, common to the silkworm of Europe, are all but unknown in Manchuria."

Mr. Consul Meadows gives the following description of the Manchurian silkworm :—

"Just before spinning its cocoon it is a bright green-bodied grub or caterpillar, measuring 9 to 10 centimetres in length, with a light-brown head. On its pale brown face there are six or eight small black specks. (Some Chinese say these are breathing holes, others eyes.)

"The body has twelve joints; on eight of these it has on each a pair of claws—five pairs of what I shall call back claws on the hinder part of the body, and three pairs of front claws on the forward part. The hindmost or tail joint has a pair of the back claws; then there are two joints without claws; then come four joints, each with a pair of back claws (one on each side); then come two joints without claws; and then the three foremost joints, each with a pair of the front claws.

"The five pairs of back claws are less developed as claws than the front ones, being, to outward appearance, of the same soft, green matter that the body is composed of, and merely tipped with a small piece of hard substance* of the same light brown colour as the head. The three pairs of front claws are, on the other hand, curved, and are entirely composed of the hard light brown substance. The five pairs of back claws serve as feet, by means of which the animal holds on to the twig or stem part of the leaf; while the front claws serve as hands, by means of which it twists round the edge of the leaf to its mouth. When the grub is in one of its torpid periods it holds on to the twig solely by means of the five pairs of back claws, the foremost five joints (three with claws and two without) being altogether detached

* On examination I found this seeming hard substance to be composed of microscopical claws, thirty or forty in number, which are retractile like the claws of felines.—L. S.

from the twig in the air. A little above the claws on each side there is on each joint or segment a bright blue speck, out of which two or three hairs grow. A little above these blue specks there is on each side, down the last or tailmost nine joints, a brownish streak, which two streaks widen and join together as a brown band on the tail joint. On the eighth and ninth of the joints, counting from the tail end, there are on this brown streak two silvery or white metallic-coloured spots on each side."

"The brown band does not extend to the foremost three joints; on the other hand, each of these joints has two blue specks on each side, one above or higher up than the other. The animal is thickest about the second and third joints, counting from the head, and tapers off somewhat toward the tail." *

COCOONS.



BOMBYX PERNYL



ATTACUS JAMA-MÂI.

Photographed from the two samples (actual size) by Mr L North-Szigetváry.

* Commercial Reports from Her Majesty's Consuls in China and Japan, 1865.

ON SOME RECENT ESTIMATES OF THE WORLD'S COAL SUPPLY.

COMMUNICATED BY MR. MARK STIRRUP, F.G.S., F.LINST.,

And read to the Members in the Library, February 26th, 1894.*

In the discussion which followed the recent address of Professor Boyd Dawkins, "On the Coal Fields of New South Wales," which the Professor told us occupy an area considerably greater than the united coalfields of the British Isles, I took occasion to refer to an estimate of the world's coal supply, which appeared on the same day (27th January, 1893) in the *London Standard*.

This was the telegraphic summary, from their Berlin correspondent, of a just issued report by a Prussian mining expert, to which special prominence was given, and to which attention was drawn by a leading article on the subject. The communication is as follows:—

"Herr Nasse, the Prussian official mining expert, has just published the result of his investigations into the probable duration of the coal strata of the World, and an estimate of the amount of the present contents. He believes that the coal strata of Europe, excluding Russia, those of Austro-Hungary, France and Belgium will be exhausted first—in five centuries at most; then those of Great Britain; and finally those of Germany. He anticipates the American supply will not last longer than the European."

In the editorial article accompanying this summary it is remarked that "Any calculation of this kind must necessarily partake of a speculative character, especially when comprehending so wide an area as in the present instance."

With this remark, I think, the members of the Manchester Geological Society will all agree, seeing the diverse opinions that have been promulgated from time to time as to the duration of the coal supply of the British Islands, a compact area, of limited extent, and whose geology has been well worked out. It seems a somewhat hazardous speculation, therefore, to estimate the World's coal supply, vast regions of which have never been surveyed or explored for the purpose of estimating their concealed mineral wealth. Not having seen the text of Herr Nasse's report, I do not know his reason for excluding Russia from his estimate of the coal resources of Europe. It cannot be on account of her poverty in that respect, as she possesses large coalfields in the Donetz basin of the South and elsewhere.

In considering the future of Europe in connection with the world's coal supply one must not neglect to take into account the immense coalfields of the East—India, China, and Japan—and their probable influence in the near future on the continuance of the supremacy of the West. Before the termination of the five centuries or less, which, according to Herr Nasse, is to see the exhaustion of the European coalfields, and the consequent decadence of the power and commercial advantages which the

* Reprinted from the "Transactions Manchester Geological Society," Part VII., Vol. XXII.

Western nations at present possess, changes in the path of Empire may have been brought about by the awakening of the Eastern nations to the knowledge of their strength with the possibility of throwing off the dominance of the Western world. This revolution, predicted by that philosophic thinker and able writer, Dr. G. Le Bon, in his work on the "Civilisations of India," will be brought about, he says, not by the might of cannon, but the field of battle will be the market-halls and marts. Under the influence of steam and electricity, Dr. Le Bon goes on to say, the nations of the earth are daily being brought into closer contact, the result of which will be a general equalisation of the value of industrial and agricultural products, and consequently of wages over the surface of the globe.

Now, in such a competition the Orientals, who form the majority of the inhabitants of the globe, and who are at the same time of all people the soberest, will inevitably become the regulators of wages. Already the wheat of India is sold in Europe cheaper than our own grain. What will it be when manufactures shall be beaten in their turn in our Western world by nations making goods as well as ourselves, thanks to our own machines and at prices twenty times less?

The miner who is accustomed to spend five or six francs a day, and who threatens to shake the social edifice because he is not getting more than three or four, will soon see manufacturers from China, then open, for coals hewn by men who believe themselves rich when their daily wages reach five or six sous. The operatives who strike work in order to raise their wages will no longer find employment, because these same coals will feed in the extreme East manufactures supplied with our machinery, worked by men happy in gaining a sum twenty times less than that asked by Europeans, and whose produce will inundate the world. That all this is not a dream is manifest in the gradual increase of cotton mills in Bombay and other parts of India and also in Japan, which latter country, with Tonquin, are already exporters of coal and rivals in the Eastern markets, once served by British producers only.

Returning, however, to the coal resources of the East, China, it is well known, has immense reserves of coal, for the most part undeveloped. Japan is also richly endowed with the combustible, and the recent acquisition of Tonquin by the French has led to the discovery of rich coalfields in that country which are now being opened out and worked by French and English capital. Of the extent and value of these coal deposits of Tonquin Prince Henry of Orleans, who visited them last year, speaks in the highest terms.

The principal deposits now being worked at Hong-Kay and Kebao are supplying the markets at Hong Kong and Singapore with good furnace and steam coal.

Respecting the extent of the coal deposits of Tonquin Prince Henry says: "The next geological map of the country will be marked by a wide black band traversing the colony in its greatest extent from south-east to north-west, appearing in the Isle of Hainan, at Kibao, at Hong-Hay, then in the Dong-Trieu, at Quang Yen, and again upon the banks of the Red River, at Yen-Bay, at Lao-Kuï, where the trials have revealed a combustible equal to the best Cardiff. These deposits have been traced as far as the province of Yunnan, forming veritable mountains of coal. 'Tonquin' says the Prince, quoting the words of Lord Connemara, 'is called to play the rôle in the extreme East that England plays in Europe, and that will be the great coal producer of Asia.'"

Turning now to the consideration of Herr Nasse's assumption that the American coal supply will not last longer than the European, one is at a loss to know upon what statistical or other evidence he bases his belief. Certainly such a computation is opposed to all our previous conceptions of the great extent and richness of the coalfields of the United States and the Dominion of Canada, some of which fields are

practically untouched. The resources of the United States, when considered as a whole, are as yet imperfectly known, as the surveys are not completed. It is only in the eastern States—those earliest colonised—here the mineral wealth of the country is satisfactorily made out and computed.

As the tide of immigration has been driven further and further west so have the various regions been explored, with the result of finding rich coalfields in close proximity. Many of the valuable coal deposits of the central States, in the Mississippi province, are scarcely touched, and only need capital for development and ready outlets for the coal to become a power in the world.

It would, however, far exceed my intention in referring to this subject of the world's coal supply to give even a summary description of the resources of each State of the Union so far as at present known; all that I purpose doing now is to offer some little evidence at hand in disproof of Herr Nasse's view of the speedy exhaustion of the American coal resources. For this purpose I have selected a few official statistics of some of the western States, including those bordering on the Pacific.

Commencing with Alaska, the most northerly possession of the United States (purchased a few years ago from the Russian Government), it is known from recent surveys and explorations that the country is rich in coalfields as well as other minerals. In the report of the Governor of Alaska to the United States Government for the year 1888 mention is made of official visits to some of these deposits on the seaboard. Within the arctic circle coal seams crop out at many places along the coast between Cape Lisburne and Point Lay, and miners have reported immense out-cropping seams—mountains of coal—in the interior and on the banks of the Yukon River and its tributaries.

In Yakutat Bay at the foot of the St. Elias Alps coal has been reported, and coal seams have been worked on Admiralty Island and the Prince of Wales Islands, on the south-east coast of Alaska. But the principal supply of Alaska coal has been, so far, from Coal Bay on the eastern shore of Cook's Inlet, twenty-five miles north-east from Port Graham, the place where the Russian-American Company's mine was located. In this neighbourhood the coal measures frequently outcrop along the shore for a distance of nearly one hundred miles. The coal is of excellent quality, and has been shipped to San Francisco and other points along the Pacific slope, and it is expected that ere long sufficient coal will be mined to satisfy all the demands of the coast.

The Alaskan coal mines possess advantages of being contiguous to tide-water and commodious harbours, and the Governor in his report asserts that there is coal enough in Alaska, and of the very best quality, to supply the wants of the whole of the Pacific slope for centuries to come. That this recent addition to the known coal resources of America will be largely augmented is certain, as the mineral wealth of the territories yet unsurveyed becomes better known. As an evidence of this I purpose to refer, as briefly as possible, to those less known western States, with which, from their more recent colonisation, the public is less familiar.

Our acquaintance with the western States of the Union and those bordering the Pacific is, as a rule, confined to their known richness in metalliferous ores, gold, silver, copper, lead, &c., but as these ores have been worked, explorations for coal have been made for the reduction of the ores and other purposes, resulting in unsuspected deposits of coal being brought to light. I shall just refer to a few of these States, quoting from recent reports of their respective Governors to the Secretary of the Interior.

In Washington territory adjoining British Columbia there are several large coal-fields being successfully worked, the coal, in the main, being rich bituminous. Coal-

mining, says the inspector, is destined to be an important factor in the development of the territory.

Of Montana the Governor reports inexhaustible fields of coal, some of which, near the railroads, are being actively developed, and coals placed on the market.

The adjoining territory of Wyoming is said "to abound in coal, and it is found in every county in the territory, sometimes cropping out on the banks of ravines, creeks, and streams, and nowhere at such a depth as makes mining very expensive." For most part bituminous, adapted to all domestic purposes, as well as for locomotives.

Of the mineral resources of Dakota that of coal occupies a prominent place, including as it does "vast coal deposits, which, while in no way equalling, exceed in extent, the coal deposits of Pennsylvania."

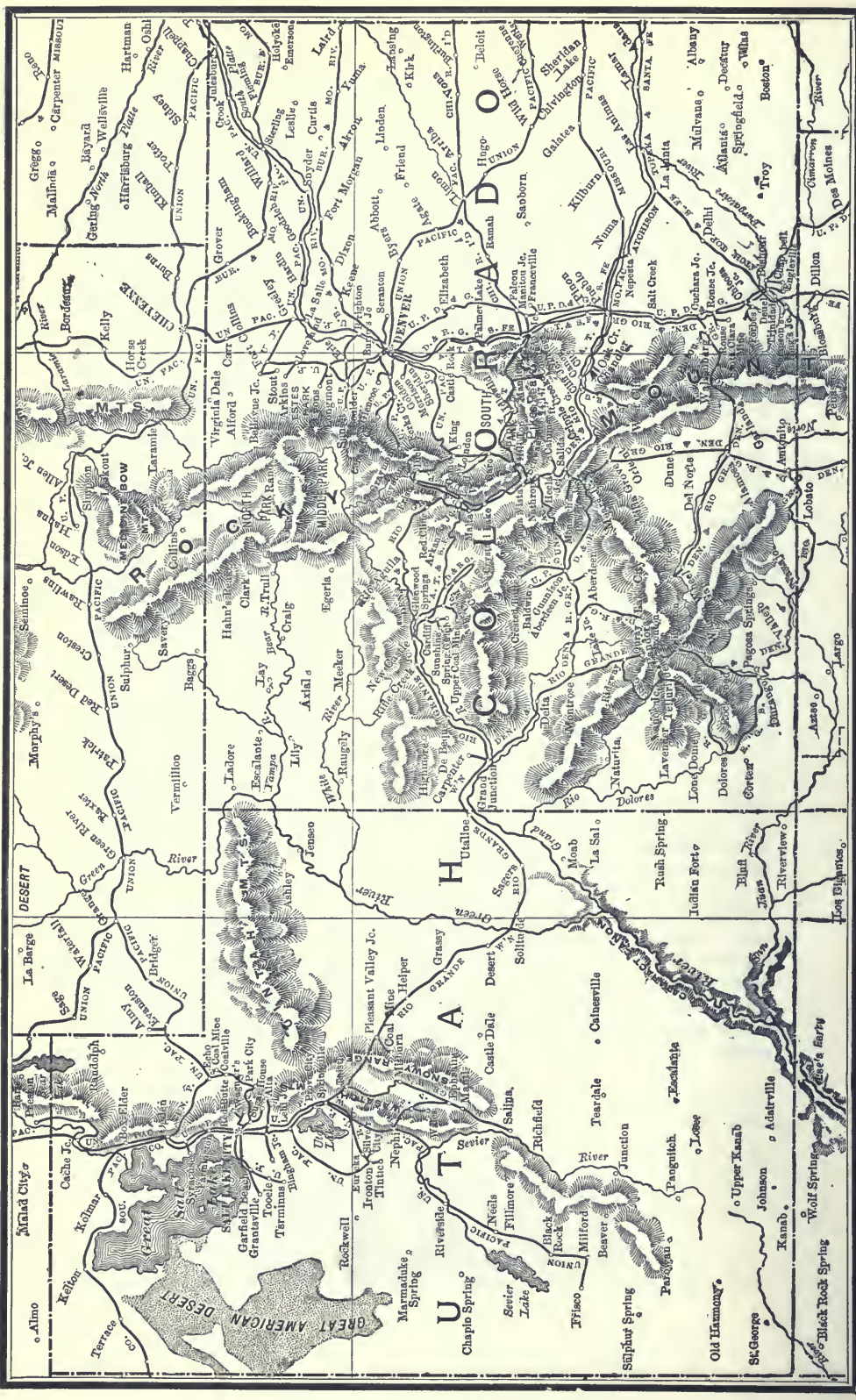
"Among the undeveloped resources of New Mexico, the principal," says the Governor, "are our coals, the character of which are anthracite, lignite, and bituminous." He speaks of the coal measures of the territory as "of very great extent, aggregating fully 4,000 square miles of at least 10ft. veins of coal. This vast store of latent steam power, in connection with a corresponding deposit of all the precious and useful metals usually found in immediate or convenient proximity to this coal, indicates, of itself, the establishment here sooner or later of very important manufacturing industries."

Of other of these western States, as Utah and Colorado, the same tale of undeveloped coal resources might be told, but I think I have quoted sufficiently from official statistics to disprove Herr Nasse's opinion of the American supply of coal following rapidly in the wake of his predicted exhaustion of the European coalfields.

Of the central and eastern territories of the United States and their immense coal resources I have not attempted to collate, as of their value the public is better acquainted. The Dominion of Canada is also well known to be rich in coal, the extensive coal basins of Nova Scotia, New Brunswick, and Newfoundland having long been exploited near the seaboard on the east coast, and there are large supplies in Vancouver Island and British Columbia on the Pacific side. The result of this rapid and imperfect survey scarcely bears out the dismal prospect of a world without coal in five centuries to come, which if such a consummation were even likely to be realised within that period, the coming exhaustion would make itself felt long before in almost prohibitive prices and much consequent suffering.

The nineteenth century owes much to scientific discovery, but a substitute for coal is as yet a desideratum, which Nature's laboratory has not yet disclosed nor the ingenuity of man provided. Natural gas and rock oils, the only heat and light producers which have come into competition with coal, are too sparsely and sporadically distributed to take its place, and these natural products are also being rapidly exhausted in many of the regions where these resources have been found and tapped.





Map to illustrate paper, "A Journey Across the Rocky Mountains." By Mr. C. H. Bellamy, F.R.G.S.

A JOURNEY ACROSS THE ROCKY MOUNTAINS.

[Addressed to the Society in the Large Hall of the Chamber of Commerce,
Wednesday, March 21st, 1894.]

BY MR. C. H. BELLAMY, F.R.G.S.

(*See Map.*)

A RUN to the Rocky Mountains naturally has its starting point in Chicago, a wonderful railway centre, to which all the great railway systems of the United States seem to converge. The first skip is to Denver, a matter of twelve hundred and ten miles by the Atchison, Topeka, and Santa Fé Railroad, it being possible to remain in the same car all the forty-two hours' journey. The ride across the States of Illinois, Missouri, and Kansas is almost devoid of interest. There is a great sameness about all American large towns and cities, and State capitals and Capitols, and it is only when the train has fairly entered the State of Colorado and reaches Pueblo, that the real interest commences. The line now runs in view of the first range of the Rocky Mountains until it reaches Denver—one of the most remarkable cities in the States, situated on a plateau a mile above sea level, in full view of a range of snow-burdened mountains;—another great railroad centre, destined to be a close rival to Chicago; the rendezvous of the mining interests of Colorado and Utah. With such exceptional natural and commercial advantages, it is safe to prophesy a proud position for Denver in the not far distant future.

The Denver and Rio Grande Railroad, which proudly calls itself "The scenic line of the world," makes its arrangements with a view to the maintenance of this reputation. Leaving Denver by the early morning train of this company, a closer acquaintance is soon made with the Rockies, as the railroad skirts their bases for about one hundred and twenty miles. Curious natural formations perched on the summits of conical hills, strange rocks and monoliths, some of them of colossal size, rapidly pass into and out of view, till, rising to an elevation of 7,238ft. above the sea level, a beautiful sheet of water called Palmer Lake is reached. A curious phenomenon about this lake is that it is so equally poised on the summit of the "Divide," that its waters flow through outlets northwards into the Platte River, and southwards into the Arkansas. The next stop is Colorado Springs, which so lies under the shadow of the snow-capped Pike's Peak (14,147ft. high), that in the short days the sun drops out of sight behind the mountain with startling suddenness at four o'clock in the afternoon.

At the manufacturing and smelting town of Pueblo the railroad turns to the west and commences to pierce the Rockies, until at one hundred and sixty-one miles from Denver, Cañon City is reached—justly so named, for it stands at the entrance to a most stupendous cañon, said to be the greatest penetrated by any railroad, for the Grand Cañon of the Arkansas is by a universal consensus of opinion acknowledged to be one of the wonders of the world. The Arkansas river which rises one hundred and seventy-five miles to the north-west of Cañon City, here breaks its way through the front range of the Rockies, by one of those mighty gorges which almost

appear to be cleft as cleanly and clearly, as if some Titanic nature-builder had cracked the earth's crust with a gigantic blow of his sledge-hammer during some of his moulding processes. Anyhow the river has found and utilised the passage to convey its waters through the mountains, and then to enter upon its uneventful course to the Mississippi. Just beyond the city, and quite suddenly, the train enters the Grand Cañon. Such a sudden transformation is difficult to describe. Out of bright sunshine into a gloomy gorge, through which the river angrily dashes along in whirlpools and rapids, and from which has been stolen in part, and part blasted from the rock, just sufficient room to lay a single set of rails. Indeed, in one part even this could not be obtained, so iron girders are fastened to the rock on either side, and a platform suspended from these, upon which the track is laid, running not across, but parallel with and above the river. The ride through the cañon is weird in the extreme. On the left the river, a seething torrent, roaring even above the noise of the train, bounded by a precipice rising in height to 2,600ft., with pinnacles at points even higher, until the "Royal Gorge" becomes dark and sombre, it being impossible for the sun's rays to penetrate its depths in some places. The sky above forms a deep blue arch of light, the way being merely a fissure through the heights. Threading its sinuous way in a very snake-like fashion, the train creeps round every bend of the gorge, every turn of the river, doubling up in a most extraordinary fashion—which could never have been suspected of these big American cars—for on some of the curves travellers on the last car seem able to throw an orange across to the engine when it has rounded the bend.

The description of this Cañon is in the main points applicable to most of the others traversed by these railroads, although each has its distinctive features, but all alike are majestic, stupendous, sublime.

Emerging from the "Royal Gorge," the narrow valley of the Upper Arkansas is traversed, with the striking serrated peaks of the Sangre de Cristo Range (Blood of Christ) close at hand. Then the Collegiate Peaks come into view, named after the Colleges of Harvard, Yale, and Princeton, and shortly after Leadville is reached, which is the greatest mining camp and highest city in the world, having an elevation of 10,200ft. The railroad ascends still higher, rising two hundred and eighteen feet in seven miles, where it reaches the top of Tennessee Pass. A very rapid descent is now made, the track dropping 1,747ft in twelve miles, the train running all the way under brakes only, and sometimes in narrow gorges for miles under long snow-sheds, and speeding through, in quick succession, the Red Cliff and Eagle River Cañons. Here can be seen one of the most remarkable of the many wondrous sights so plentifully spread by Nature in this region—the Mount of the Holy Cross, so called because it bears an everlasting cross of snow on its bosom, which is the effect of two gullies, an upright one of about fifteen hundred feet in length, crossed by a transverse one of about half the length, and always filled with deposits of snow, never reached by the sun. In winter this pretty effect is not decipherable, as it is lost in the mountain's great white coverlet. The Eagle River Cañon not only shows some wonderful specimens of natural beauty but also the wonders of human handiwork, for its sides and summits are made the resting places for the shaft-houses and dwellings of miners placed in apparently the most inaccessible spots. Some are perched two thousand feet above the track, more like the eyries of eagles than human abodes. The Cañon of the Grand River which follows is sixteen miles in length, and rivals in some places the Grand Cañon of the Arkansas. The route follows the Grand River to its confluence with the Gunnison at Grand Junction, then traversing for about one hundred and fifty miles what is known as the Colorado Desert. The railroad now climbs the Wasatch Range, a constant ascent for a distance of ninety-five miles, passing through

the famous portals of Castle Gate, which stand at the entrance of Price River Cañon. Two high pillars, or ledges of rock, offshoots of the cliffs behind, one five hundred feet high and the other four hundred and fifty feet, stand like sentinels guarding the cañon. Between them, separated only by a narrow space, the river and the railroad both run, one pressing closely against the other. Once past the gate and looking back, the bold headlands forming it have a new and attractive beauty. No other pinnacles approach them in size or majesty. Fantastic forms abound in the cliffs which hem in the track. Here a mighty castle with moats and towers, loopholes and bastions; then a gigantic head or monument appears; and so until, having crested the summit, the train rapidly rolls into Utah Valley, with Utah Lake quietly resting in its centre, and shortly after reaches Salt Lake City, the seat and stronghold of the Mormon ecclesiastical system.

A few miles from the city is the great Salt Lake, a mysterious inland sea, which, more than any other body of water on the globe, has created and left unsatisfied the curiosity of mankind. Its dead, dreamy, silent, tideless, slumbering waters are still an enigma, both to the learned and the unlearned. The lake has an area of 2,500 square miles, and its surface is higher than the Alleghany Mountains. Its mean depth is about sixty feet, and numerous small islands ornament its bosom, the principal of which are the Antelope and the Stanbury.

The most mysterious thing about this inland sea, apart from its saltness, is the fact that it has no known outlet. A great number of fresh water streams pour into the lake from all sides, yet the water remains salt, and the lake does not overflow. It is stated that its waters contain an average of 17 per cent of solid matter. The Dead Sea has about 24 per cent, and the Atlantic and Mediterranean about $3\frac{1}{2}$ per cent. Within a comparatively recent date it has become a fashionable bathing resort. In the long sunny days of July, August, and September, the water becomes deliciously warm—much warmer, in fact, than the ocean, and this pleasant temperature is reached a month earlier, and remains a month later. The water is so dense that one is sustained without effort, and vigorous constitutions experience no inconvenience from remaining in it a long time.

We now turn eastward, and retrace our route to the Atlantic as far as Grand Junction, then taking the opportunity of crossing the Rockies by another route—the narrow gauge, *via* the Marshall Pass and the Black Cañon. Coming out of Grand Junction the train rolls slowly upon the longest bridge in the State—950ft. long—spanning the swift yellow waters of the Grand River, where the Gunnison joins it, and following the course of the latter river for about fifty miles. Reaching Delta, a pastoral centre, there is a splendid view of a snow-capped range right ahead. This has to be surmounted, and so another engine is taken on; but, although both work to the full extent of their power, at times the train does not go beyond a foot pace, for in 17 miles there is a rise of 2,200ft. Looking across the pass a truly magnificent and awe-inspiring prospect is presented. It is not so much in the form of crags and peaks, but a beautiful undulating stretch, down one mountain side and up another. Sometimes it seems as if this has a greater feeling of immensity and power than has the narrow gorge. Slowly creeping round the side of the mountain, until Cerro Summit is reached, at an elevation of 7,964ft., then, slowly descending 1,000ft. in half an hour, the train arrives at Cimarron Creek, a charming station, nestled amongst the gulches on the sparkling creek, and then enters the Black Cañon of the Gunnison. Again the railroad follows the river, alongside of it as near as it can get—sometimes it seems strange that the embankment of stones and boulders, apparently loosely thrown down, should hold together, so near to the edge runs the track. We are hurled along between close-shutting crags that are the type of solidity, yet seem to

waver and topple at their summits as we gaze at them, cut strongly against the tremulous blue of the sky. This is the site and monument of a great struggle between forces such as we have no capacity to comprehend. Here for miles we pass between escarpments of rock, 1,000, 1,500—aye, here and there more than 2,000ft. high. This is not a valley between mountains with sloping sides slowly worn away. Here are vertical exposures that fit together like mortise and tenon ; facing cliffs that might be shut against one another so tightly that almost no crevice would remain. To view this mighty chasm thoughtfully is to receive a revelation of the immeasurable power pent up in the elements, whose equilibrium alone forms and preserves our globe ; and if we call it "awful," the word conveys not so much a dread of any harm that might happen to us there, as the vague and timorous appreciation of the dormant strength under our feet. If the gods we call dynamic can rive a pathway for a river through twenty miles of solid granite, of what use is any safeguard against their anger ?

So on through this narrow channel we went, chasing round the numerous curves, the river, a mighty torrent, roaring over boulders and jumping several feet at a time. Although the walls are dark-hued enough to give the place its name, they are of red sandstone in many places, and from their crevices, and on their sides and tops, shrubs, cedars, and piñons grow in rich profusion. Sombre hues, however, prevail ; the stream fills the place with its heavy roar ; the sunlight falls upon the topmost pines, but never reaches down the dark red walls. The scene is varied, kaleidoscopic, constantly changing. A stream of water, named Chippeta Falls, white as wool, pitching from the brow of a precipice two thousand feet above, is dashed into fragments by lower terraces, and reaches the river in fine white spray. In the very centre of the cañon, where its bulwarks are most lofty and precipitous, stands the most striking buttress and pinnacle of them all, a tremendous monument of solid stone, with all the grace and symmetry of an obelisk. This is the famed Currecanti Needle. It stands out somewhat beyond the line of the wall, from which it is separated—so that from some points of view it looks wholly isolate—on one side by a deep gash, and on the other by one of those narrow side cañons, which in the western part of the gorge occur every mile or two. These ravines are filled with trees and make a green setting for this massive monolith of pink stone, whose diminishing apex ends in a leaning spire that seems to trace its march upon the sweeping clouds. Thus for twenty miles the ever-changing variety of the Black Cañon holds the traveller entranced. At length the train rolls out into the valley of the Gunnison, and pastoral scenes take the place of the tumultuous grandeur just passed through. But this change is not for long, for a new marvel approaches, and we are close upon the Marshall Pass.

The constructing engineers of this railroad preferred to take their lines any distance round a corner rather than climb a hill or tunnel through it. However, when Nature has not provided a gorge through the mountains, they have been compelled to take their rails over the crests, and it is to this circumstance that we owe the entrancing rides over these mountain passes.

The ascent of the Marshall Pass commences at a little place called Sargent. Here another powerful engine is yoked on to the train, and we commence climbing the Pacific slope by grades of two hundred and eleven feet in the mile, the engines snorting like Titans. Standing on the platform of the car, and looking up the side of the mountain, I saw another track apparently two to three hundred feet higher than the one we were on. "Yes," said the conductor, "we shall be up there in less than ten minutes," and so it proved to be—winding round projecting headlands, on the verge of immense precipices, on the edge of which the track is so narrow that to step off the cars would mean instant destruction, for there is no room to find foothold

whilst the train is passing along the line; threading dark recesses upward we climb, the air getting decidedly rarer and cooler; soon we get into the snow line, and the track goes through great patches of snow, two or three inches thick, and in places for miles under series of great snow sheds. As the train progresses up the steep the prospect becomes less obstructed by mountain sides, and a view is obtained over miles of cone-shaped summits. Slowly the steeps are conquered, until, at an altitude of 10,852 feet, the train stops at Marshall Pass Station, upon the summit of the Continental Divide which separates the waters of the Pacific and Atlantic slopes. The track and station are here enclosed in an immense snow shed. After a careful examination of the brakes—for to them we must trust ourselves for the next hour or so—the auxiliary engine is uncoupled, and, emerging from the shed, what a magnificent prospect presents itself as far as the eye can reach! There are the snow-crowned spires of the Sangre de Cristo Range, their sharp and dazzling pyramids, which near at hand are clearly defined, extending to the southward, until cloud and sky and snowy peak commingle, and form a vague and bewildering vision. Slowly we descend, under the care of extra-powerful pneumatic brakes; there is no smoke nor cinders from the engine, for the sole force required to carry the train along is that of gravitation. To the left, towers fire-scarred Mount Ouray, gloomy and grand, solitary and forbidding—a volcano whose fires died out ages ago, and said to be the cause of all the upheaval hereabouts. The crater can be seen quite distinctly from the train. Opposite stands the companion peak, Mount Shaveno. A little further on we arrive at a point where, looking up as well as down, four tracks of rails can be seen, terrace above terrace, the last so far away as to be somewhat indistinct. We are now on the Atlantic slope, all the waters running to the eastward, and presently the descent is finished at Poncha Springs, the route entering the valley of the Arkansas, and joining the main line broad-gauge at Salida, about two hundred and seventeen miles from Denver.

Rylands on Ptolemy.—In this sumptuously printed volume the author undertakes an "elucidation" of Ptolemy, whose geography has engaged his leisure hours for many years past. Having given a very readable outline of the rise and progress of cartography prior to the time of Ptolemy, Mr. Rylands seriously sets himself the task of determining Ptolemy's errors. These he traces to four causes: firstly, errors in the itinerary distances; secondly, errors in the accepted results of astronomical observations; thirdly, errors of scale, Ptolemy having assumed a degree to measure 500 stades instead of 600; and, lastly, errors due to the projection upon which Ptolemy is supposed to have plotted his map. As to the first and second sources of error the author frankly admits that no "general principle of rectification can be applied to them." The third source of error has been dealt with before, often in too sweeping a spirit, we conceive, as it disappears altogether wherever Ptolemy was able to make use of trustworthy observations for latitude. The fourth source, that due to an erroneous projection, is now dealt with for the first time, but in no sense can we look upon the author's arguments as conclusive. By combining the errors due to a wrong scale and a faulty projection, the author arrives at the conclusion that a degree on Ptolemy's maps is equivalent to 46 geographical miles. In separate chapters the author deals with the Ptolemaic geography of Great Britain, identifying the Belisama with the Mersey, thus agreeing with Dr. C. Müller, whilst differing from most of the earlier commentators, who identified that river with the Ribble. The curious distortion of Northern Scotland he explains by suggesting that Duncansby Head was laid down by Ptolemy in accordance with a longitude obtained by observing an eclipse of the moon. In an appendix the author points out and corrects a corrupt passage in Book vii., c. 6, of Ptolemy's Geography, which deals with the problem of describing the earth within the armillary sphere.—*Proceedings, Royal Geographical Society, April, 1894.*

THREE NEW METHODS FOR THE DETECTION OF FORGERY.

BY DR. PERSIFOR FRAZER.

[Read before the American Philosophical Society, May 18, 1894.]

I wish to put on record three new methods which I have applied successfully for the purpose of detecting frauds in written documents.

The first enables one to determine with comparative ease which of two crossing ink lines was made first, and consists in observing the crossing by a lens of low power four or five diameters at a very oblique angle. If a light ink line be made over a darker one the appearance to the eye when viewing the crossing perpendicularly to the plane of the paper will be that the darker line is superposed. The reason of this is that ink lines are quite transparent, and the darker line is seen through the lighter one, and seems to make one continuous line with its two limbs across the intersection. When the paper is inclined, however, but few of the rays of light which reach the eye by reflexion from the intersection traverse and lose rays by absorption from both ink films; but the greater number penetrate only the upper ink, and do not suffer absorption by the lower.

The second is a method of judging whether or not two lines have been made with the same ink, and consists in passing over each in succession prisms of red, yellow or blue glass (or two of these), and noting the number of millimeters through which it is necessary to move each prism from the position where its thin edge is in contact with the mark to be judged to that where the colour is extinguished and the line is black. The prism is pushed horizontally over the ink mark, continually adding to the thickness of the coloured glass over the latter. When the line appears quite black the distance in mm. over which the prism has been pushed is read off and compared with the number of mm. which the other line requires to attain the same result. If the inks have the same colours these results must agree.

Third method. In 1886 I read before the Society a paper on the use of composite photography for the purpose of establishing the type of an individual's writing, and especially the signature. Since then the mechanical difficulties in the way have been greatly lessened, and the method has given most valuable results in cases before various courts. But there are many occasions where it cannot be employed for one reason or another, and in such cases I have devised a system of measurement and tabulation which accomplishes by figures what composite photography established automatically by form. The older method may be called the graphic average of the handwriting, and the latter the numerical average. The advantage of the former is that it takes into account at once *all* the elements of character, while the latter can deal only with comparatively few; but in spite of this the results attained have been very interesting.

By the system here alluded to a given number of heights, breadths, and angles of letters, and spaces between them and between words, are selected and measured in a large number of undisputed signatures. The same elements are then measured in the signature in dispute. The averages of all the elements in the genuine series is then compared with the latter, and their agreement or disagreement will generally lead to a correct judgment as to the genuineness of the disputed signature.

This method has given successful results in a direction which extends the original idea to a study of "guided hands," and it has been possible to extract from the columns of measurements, proofs of the existence of characteristics of each of the separate handwritings.—*Proceedings of the American Philosophical Society, Vol. XXXIII., p. 243.*

PROCEEDINGS OF THE SOCIETY.

FROM APRIL 1ST, 1894, TO JUNE 30TH, 1894.

The 290th Meeting was held in the Chemistry Theatre of Owens College (by permission of the College authorities), on Saturday, April 7th, 1894. The room was well filled. The Rev. S. A. STEINTHAL, F.R.G.S., Chairman of the Council, took the chair at 3-30 p.m.

Mr. H. T. CROOK, C.E., addressed the Society on "The Art of Cartography," illustrating the address with a fine series of Ordnance and foreign maps, diagrams, and lantern slides, prepared for the lecture by the "Victorians."

Mr. Crook in this lecture developed the theory of the planisphere, and the address was listened to with great attention.

Several members asked questions, and some discussion afterwards took place. The meeting closed at five o'clock.

The 291st Meeting of the Society was held in the Chemistry Theatre of Owens College, on Saturday afternoon, April 14th, 1894. The Rev. S. A. STEINTHAL F.R.G.S., took the chair at 3-30 p.m.



OWENS COLLEGE.

Mr. H. T. CROOK, C.E., continued his address on "The Art of Cartography," dealing on this occasion more particularly with the delineation of vertical elevations, showing maps, and again illustrated his address with special diagrams, lantern slides, and maps.

The address was listened to by a large audience with great interest.

Dr. R. M. PANKHURST moved that the best thanks of the Society be given to Mr Crook for the two admirable addresses given by him, and to the Principal of the College for the use of the room.

Mr. THOS. WEIR, Hon. Secretary of the British Astronomical Association, seconded the resolution, which was supported by Mr. J. D. WILDE, Mr. J. HOWARD REED and others, and the resolution was carried.

Mr. CROOK replied to some questions and gave further illustrations of the subject of his address, and responded to the vote, and the meeting closed at 5-30 p.m.

The 292nd Meeting of the Society was held in the Large Room of the Chamber of Commerce, Mosley Street, Wednesday, April 18th, 1894, at 7-30 p.m. In the chair, Mr. J. SNADDON.

Minutes of Meetings 278th to 291st were read and approved.

The following elections were announced :—

ORDINARY MEMBERS—Mr. E. Ascoli, Mr. M. Kalisch.

ASSOCIATES—Mrs. Knox Taylor, Mr. R. D. Gelder.

The presentation of a large number of books, maps, &c. to the Society was announced.

Letters from M. C. Gauthiot ; Col. Goldsmid ; Tyneside Geographical Society ; Mr. W. N. Greenwood ; Manchester Chamber of Commerce ; Messrs. Dean and Dawson ; and the British Association, were read.

The following papers were read :—

The Newcastle Society forwarded a report of General Lord Roberts' address on the Siege of Delhi.

Mr. W. N. Greenwood, on the Tidal Waves in the Wye and Severn (see p. 227).

The Akka-Haifa Railway Proposal.

Geography as a part of Technical Education in Brisbane, and the lectures given on the subject, by Mr. J. P. Thomson, Brisbane.

Mr. J. D. WILDE, M.A., one of the Hon. Secretaries, addressed the Society "On South Devon and Cornwall." The address was listened to with great pleasure and interest, and was illustrated by a number of lantern views specially prepared for this address.

The SECRETARY gave an account of Styal and Norcliffe Gardens, and of the Valleys of the Goyt, the Etherow, and the Bollin.

Mr. J. HOWARD REED addressed the Society "On the Uganda Experiences of Mr. F. C. Smith," of the Uganda Mission of the Church Missionary Society (see p. 222).

Mr. L. E. North-Szigetváry, of Newchwang, sent a paper (which was read by the Secretary) of great practical value, "On the Oak Silk Spinner." Two cocoons were sent with the paper and were exhibited (see p. 183).

The list of proposed excursions of the Society for the 1894 season was submitted and, with some small alterations, accepted.

Very hearty thanks were given to the gentlemen who had addressed the meeting to the writers and the readers of papers, and the meeting closed at a late hour.

The 293rd Meeting of the Society was held in the Grounds of Mr. Theodore Crewdson, Norcliffe Hall, Styal, who had allowed the Society the privilege of this visit, on Saturday, April 21st, 1894, at 5 p.m. In the chair, Mr. T. DENTITH.

A large number of members had the pleasure of visiting these remarkable and beautiful gardens and grounds, set out and arranged by a former member of Parliament for Manchester, Mr. R. H. Greg.

The botanists of the party were delighted with the fine collection of conifers

cedars, limes, and oaks, and the terraces were full of colour from the splendid show of rhododendrons and azaleas. The azaleas were very beautiful.

The Old Mill was interesting, as from it could be deduced the history of the cotton manufacture, and the apprentices' house, where the workhouse children were housed who were brought in earlier days to be apprenticed to the cotton trade.

Mr. Greg was in favour of the limitation of the working time of cotton operatives, and the evidence he gave helped Lord Ashley very materially to obtain the Act, and is even now (with this pretty Cheshire village in sight) interesting reading.

The "two pumps," the village playground (given by Mr. Greg long before such things had become the fashion), the village allotments, the gardens, and the comfortable and bright, cleanly cottages and cottagers, were all duly admired.

Mr. W. JOHNSON moved, and Mr. BURTON seconded, very hearty thanks to Mr. J. Crewdson for his permission to visit Norcliffe, and to the gardener, who took considerable trouble in pointing out the beauty of the grounds and in replying to volleys of questions.

Some beautiful photographs were taken, one of them, "The Dog Mound," being of interest.

The 294th Meeting of the Society was held at the Royal Oak Inn, Taxal, on Saturday, April 28th, 1894, at 6 p.m. In the chair, Mr. J. R. PICKERING.

Mr. J. J. Cottrill led a large party of members from Whaley Bridge, past the gritstone quarry, up the hill top overlooking Kettleshulme, thence swerving to the south-east to Taxal.

It was a most delightful walk of about four miles, and the members who did not know the district were greatly charmed.

After tea another walk up the valley running from Taxal to Buxton, about twelve miles in length, and some very fine scenery was found, with charming reaches of the river here and there. Photographs were taken.

Some correspondence was read to the members, and an interesting address by Mr. F. G. Jackson, delivered to the Tyneside Geographical Society, on "Polar Exploration," was also read.

Very hearty thanks to Mr. Cottrill for his leadership and for the information relating to the district he had imparted, were given on the motion of Mr. G. THOMAS, seconded by Mr. Councillor HIGHAM, of Accrington.



GOYT HALL.

The 295th Meeting of the Society was held in the Library, 44, Brown Street on Wednesday, May 2nd, 1894, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair. Minutes of Meetings, 292nd to 294th, were read and approved.

A number of additions to the Library by presentation was made known.

Letters from the Naturalists' Society of Kazan; Col. C. M. Watson, R.A., C.B.; the Public Library of the City of Boston, U.S.A.; Mr. B. Armitage, J.P.; Mr. J. F. Tristram, B.A.; Mr. A. J. Herbertson; the Wholesale Co-operative Society; Salford School Board; R. M. Pankhurst, Esq., LL.D.; Mr. J. C. Blake, F.R.G.S., &c.; Chevalier Fritzsche, Rome; Antwerp Exhibition Commission; Captain Casati; Mr. P. Douglas, Meshed; Lieut.-General Banola Bey, Cairo; Miss Barlow; the British Association; Dr. Greenwood; Sir A. and Lady Marshall; Sir Wm. and Lady Bailey; the Hon. Walter Rothschild, London; Dr. Arlidge; Mr. J. N. Schofield, the Consul for Liberia, with others, were read.

The SECRETARY made a short communication on Blackstone Edge, the Roman Road, and on Edwin Waugh's "Snowed Up."

The Proposals by Capt. Haserick to explore the West Coast of Ellesmere Land were read.

Papers on Matabeleland (by Mr. Colquhoun) on the Polynesian Labour Traffic were read.

Particulars of excursions to Switzerland, Holland, Belgium, and to Prescott and Knowsley, were given.

The Report of the Examiners on the late Examination in Geography was read.

Mr. ARTHUR BOWES addressed the members on "Notes of a Visit to Switzerland." The address was illustrated by a number of slides taken by Mr. Westmacott, who accompanied Mr. Bowes on the journey.

An interesting and vigorous discussion took place on the various papers, and the thanks of the meeting having been given to the writers and readers of the papers, to Mr. Bowes, and Mr. Westmacott, the meeting closed.

The 296th Meeting of the Society was held in the Dining Room of the Waggon and Horses Hotel, Blackstone Edge, Saturday, May 5th, 1894, at 6 p.m., Mr. Councillor HIGHAM, of Accrington, in the chair.

A large party of members, joined by a number of members of the Burnley Literary and Scientific Club, visited Blackstone Edge for the purpose of examining the remains of the Old Roman Road across the Moor.

The Society had been informed by the late holder of the shooting that no permission was required for going over the road.

On the arrival of the party on the Moor, the party was peremptorily ordered off the Moor by keepers, and attention was called to some printed notices, which bore the name of Mr. J. G. Dearden, who, it was understood, is the Lord of the Manor.

Notices of this kind, the party was informed, had not previously been seen. The Moor is unenclosed, and some members of the party, who had for thirty or forty years gone along the Roman Road and the part of the Moor from the road to the highway on previous occasions unchallenged, were puzzled to account for the change.

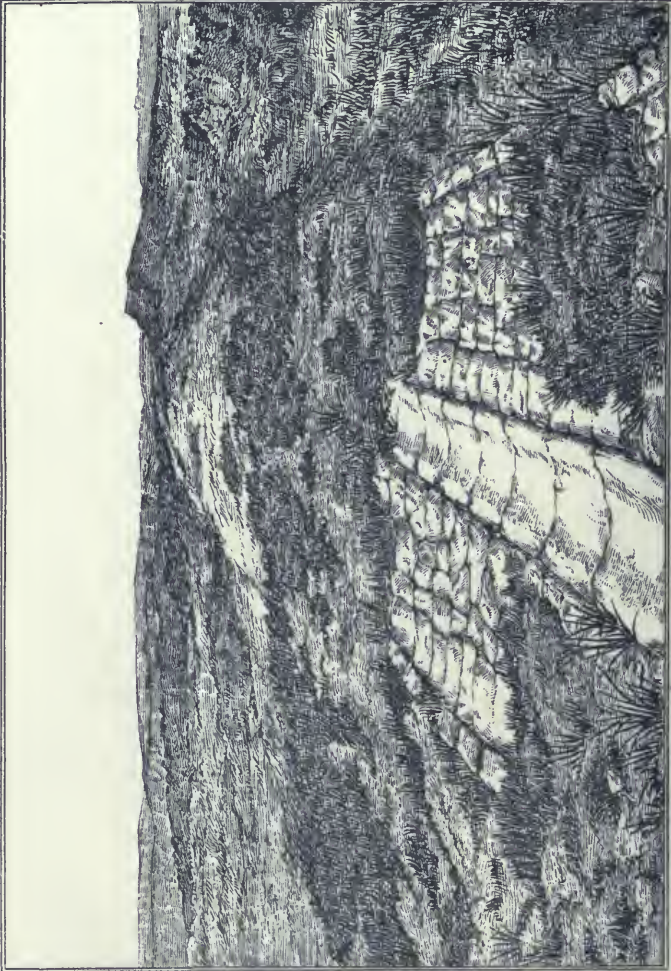
As a number of ladies were of the party, it was not thought expedient to pursue the matter, but it was felt that the incident left a sense of considerable injustice to the public, as, if any powers were granted to close roads when the Act for the new road was obtained, the rights of the public, as evidenced by the remains of the old road, would be probably safeguarded; but as this was a point in some doubt, nothing further could at the moment be done.



BLACKSTONE EDGE.

There can be no question that the closing of these old footpaths (and the Roman Road was one used by wheel traffic) must give rise to agitation which cannot be pleasant to the holders of these natural playgrounds of a dense population.

Protest, somewhat vigorously expressed, was made by a large number of the party.



ROMAN ROAD, BLACKSTONE EDGE.

Notwithstanding this drawback, a very pleasant afternoon was spent by the party, and full justice done to the excellent refreshment prepared by the host of the Waggon and Horses.

A number of letters and other communications were read to the members.

Mr. Lancaster (Burnley), Mr. J. Dilworth Harrison, Mr. H. T. Crook, and others took part in describing the district and in the general discussion.

Thanks were given to the leaders of the party, and the meeting closed.

The 297th Meeting of the Society was held in the Peel Park Art Gallery, on Wednesday, May 30th, 1894, at 3 p.m.

The Corporation of Salford had collected an exceedingly fine loan collection of pictures to celebrate the Jubilee of the Royal Borough.

Mr. B. H. Mullen, M.A., the Curator of the Museum, received the members, and pointed out the pictures and other works of art collected.

Some hours were spent in closely examining the Exhibition; the Charter and original deeds on view were looked at with great interest, and the visit was very much enjoyed.

The report of a party of members, who had been journeying through Switzerland and to the Italian Lakes, conducted by an agent of Messrs. Dean and Dawson, through Dover, Calais, Rheims, Bale, Lucerne, the Rhigi, the Bernese Oberland, the St. Gothard, Lugano, and back, was presented.

The party had very much enjoyed the excursion.

Some correspondence was also read.

Very hearty thanks were given to Mr. Mullen, and gratification was expressed at the fine collection brought together by the Salford Corporation.

The 298th Meeting of the Society was held, on the invitation of Mr. and Mrs. Benjamin Armitage, at Chomlea, Wednesday, May 30th, 1894, at 7 p.m. Mr. T. DENTITH in the chair.

A very large party of members had accepted the kind invitation to see the beautiful collection of rhododendrons and azaleas of Chomlea, which are famous.

Unfortunately, the few days before the visit had been very wet and a good deal of the bloom had fallen, and it was also wet on the day of the visit.

Mr. and Mrs. Armitage, with their usual kindness, did not allow this to interfere with the pleasure of the visit, for they very graciously opened the house, with its beautiful collection of Art treasures, to the members' inspection, and the meeting was held in the billiard room.

Mr. ARMITAGE gave some very interesting reminiscences of a large number of public men, some of whose portraits were on the walls, and whom Mr. and Mrs. Armitage have had the pleasure to entertain at this beautiful house.

Mrs. Armitage kindly gave tea to the party.

Some fine photographs were taken of the house and grounds.

Very hearty thanks to Mr. and Mrs. Armitage closed a most interesting and well-spent afternoon, and the members at dusk dispersed.

The 299th Meeting of the Society was held at the Ram's Head, Disley, Saturday, June 9th, 1894, at 6 p.m., Mr. THOMAS DENTITH in the chair.

The Society had the kind permission of Lord Newton to visit Lyme Hall and Park, and journeyed by rail and road to Disley.

A walk through the park by Lyme Cage brought the party to the hall, and the housekeeper showed the members this historic house, the furniture, pictures, works of art, the chapel, and the secret panel. Some hours were spent in going through the hall and in inspecting the great collection of valuable and beautiful treasures.

Rain prevented any close examination of the gardens, but fine glimpses were obtained of the stables and kennels of the famous Lyme Hall dogs.

After tea, letters from Sir J. Leigh, Kt., M.P.; Dr. Gray, of Afghanistan; Sir E. Leader Williams, Kt.; Mrs. Brayne; The Hausa Association; and others, were read to the members.

Thanks to Lord Newton, to the leader of the party, Mr. B. O'Connor, and to Mr. Joel Wainwright, who had come from his house to aid the party, but who did not find us until after tea, were duly rendered, and a most interesting meeting was brought to a close.

The 300th Meeting of the Society was held in the Park, Prestwich, Saturday, June 16th, 1894, at 5 p.m., Mr. B. O'CONNOR, the leader of the party, in the chair.

Miss Philips had very kindly given permission to visit the Park, the Gardens, the North Woods, and the reserved portions of the estate.



PRESTWICH CHURCH.

The head gardener received the members, who thoroughly enjoyed again making a visit to a house where, in past times, the cheery face of the late Mr. R. N. Philips had often welcomed some members of the party.

The sylvan horsetail was found in great abundance.

The visit was much enjoyed, and thanks were heartily given to Miss Philips for permission to visit, to the head gardener, and to Mr. O'Connor for the descriptions he gave of the gardens, the botanical treasures, and from the terrace, the fine example of a river-terraced valley, as shown by the Irwell in that district.

Letters were read from The Right Honourable the Lord Mayor, The Right Honourable Jacob Bright, M.P., Sir Bosdin T. Leech, Captain Lugard, and others.

The members dispersed—some to Prestwich, and others through charming walks of wild wood to Molyneux.

The 301st Meeting of the Society was held at the Electrical Works of the Manchester Corporation, Wednesday, June 20th, 1894, at 5 p.m., Mr. Councillor W. SHERRATT, J.P., leader, in the chair.

Mr. Sherratt had obtained permission for the Society to visit these works, and the engineers were in attendance to exhibit the machinery and to reply to a large number of questions.

About three hours were spent at the works, and the members were very much pleased with them. They were very glad to find that every prospect of a financial success was in evidence.

Thanks to the Corporation, the Officials, and the Chairman were heartily given.

The members carried away a very large amount of information, and had a most striking object lesson in the methods and results of municipal work in new scientific departments.

The 302nd Meeting of the Society was held at the Royal Hotel, Prescott, on Wednesday, June 27th, 1894, at 6 p.m. In the chair, the Rev. S. A. STEINTHAL.

A large number of members, under the leadership of the Chairman of the Council and the Secretary, visited Prescott to inspect the new large works of the Prescott Watch Manufactory.

The party was received by the manager, who gave the Secretary an illustrated history of watchmaking at Prescott and of the origin and progress of these new works, and he also presented the members with various documents on the same subject. The book and copies of the papers have been placed in the Library.

The party was divided into groups, and each group had its own guide, who explained the whole process by the aid of most beautiful and ingenious machinery, from the raw metal to the finished watch.

Prescot has long been noted for the manufacture of watch motions, which were made in small workshops and sent to Coventry and London to be put together and finished.

The introduction of machine-made watches from America and Switzerland has almost extinguished that trade, and the old Lancashire town had fallen on evil days.

This new movement has absorbed all the old tradesmen, and was found to be of very great interest, not only in itself, but it was vividly realised how important to the town had been the introduction of this new industry. A large number of work-people are employed in fine, light, lofty rooms, and since the factory was built about 300 new houses have been erected in the town for the accommodation of those employed at the works.

About 500 hands are at present engaged, and when the whole of the factory is completed about double that number will be required; and since the opening of the part of the works now finished the shareholders have had a steady dividend of about 6 per cent per annum.

At present only men's watches are made, but when the works are completed the company propose to make ladies' watches.

The members regretted they had not more time to see the exquisite machinery (itself as intricate and delicate as the works of a watch, and most of the machines being worked by young women) turn out the small screws, wheels, pinions, and all the microscopic machinery which goes to the complete make-up of a pocket timekeeper.

The officials were exceedingly kind, answering the questions which poured on

them from all sides, and making it during the visit very clear to the members how a watch grows.

It was with very great pleasure that the members passed a very hearty vote of thanks to the directors of the company for permitting the visit, and to the manager and his assistants who had made the visit so pleasant and profitable.

Two or three photographs of the buildings were taken.

Adjournment was then made to the Royal Hotel, where another contingent who had come by a later train joined the party, and lunch was had.

The whole party drove to Knowsley, where, under the guidance of a keeper, placed at their service by Major Hopwood by permission of the Earl of Derby, one of our Vice-Presidents and President of the Liverpool Geographical Society, they were shown the woodlands, the ferneries, the pleasure gardens and the kitchen gardens, the stables, the lake, and fishing cottage, and several hours were delightfully spent in the great park and grounds of this great Lancashire nobleman.

The immense grounds tired out the party, who were glad to rest from time to time.

Several photographs of the gates, the hall, the fishing cottage, and of the members present (in groups) were taken.

A capital tea was provided at the Royal Hotel, to which the party did full justice.

The day was a memorable one in the Society's history, and very hearty thanks were accorded to the Earl of Derby, G.C.B., Major Hopwood, and the leaders of the party.

Letters were read to the meeting from Miss Maples, the Under Secretary of State for Canada, Mr. J. D. Fairley, F.R.G.S., the Editor of the *New Weekly*, Sir G. Taubman Goldie, K.C.M.G., and the Colonial Minister of France.

An account of the distribution of the prizes won by Yorkshire children at the Examination in Geography by His Worship the Mayor of Leeds (Councillor Leuty), and of the addresses given on the occasion by the Mayor, Mr. J. D. Wilde, Mr. Frank Curzon, and others, was given.

The report was received with great pleasure.

The Secretary was requested to congratulate Sir Leader Williams, C.E., on his acquisition of the new dignity.

Lady Bosdin Leech, Mr. Wm. Hamer, Mr. W. Grant (of Burnley Literary and Scientific Club), Mr. Fullerton, J.P., Mr. Richard Davies, the Chairman and Secretary, with others, took part in the proceedings, and the pleasant return journey was duly made.

The 303rd Meeting of the Society was held on Friday, June 29th, 1894, at the Hydraulic Works of the Manchester Corporation, at 5 p.m. Mr. Councillor SHERRATT, J.P., acted as guide, and took the chair.

Mr. Sherratt having obtained permission, a large party of members assembled.

Mr. SHERRATT gave a full account of the origin and progress of these excellent works, and the engineers took considerable trouble in showing the machinery and explaining the working.

Several models of hoists and of the application of the hydraulic power were exhibited and explained.

The members were very much interested, and were glad to be informed that the works were not only a mechanical but a commercial success.

A good number of members, who are members of Corporations in neighbouring towns, were present, and they were very much delighted. Their questions were very pressing, and information was given to them which will, no doubt, bear fruit in other localities.

Very hearty thanks were given to the Corporation, Mr. Sherratt, and the Engineers in charge for their kindness and attention.

A long time was occupied with the inspection.



PEVERIL CASTLE.

The 30th Meeting of the Society was held at the Hope Hotel, Derbyshire, on Saturday, June 30th, 1894, at 6 p.m.

Professor Boyd Dawkins, M.A., F.R.S., one of the Vice-Presidents of the Society, kindly took charge of a very large party by the new route to Derbyshire, just opened by the Midland Railway Company.

He led the company through Hope to the Castle at Castleton, discoursing on the physical geography and the geological conditions of past and present times, and on the Peveril Castle walls, taking the splendid panorama as a text, gave a most interesting and instructive analysis of geological action with reference to limestone, its deposit, changes, intrusive rocks, and the action of water.

Then he led the party to the Wind Gates, "Winnats," and to the Caves.

Several hours were spent in examining these wonders of the Peak, and on returning some members parted with some money in the purchase of polished specimens of beautiful stones found in the district.

After tea, which was very grateful, an inspection of Hope Church and Graveyard, with the curious gargoyles on the outside of the church and the quaint inscriptions on some of the tombstones, gave some amusement.

Very hearty thanks to the Professor were tendered on the motion of Mr. H. T. CROOK, C.E., seconded by Mr. Councillor HIGHAM, of Accrington, and supported by Mr. J. T. OGDEN and others.

Professor DAWKINS replied in a humorous address; and the party returned to the new Hope Station, on the Dore and Chinley Railway, with a very fervent hope that the Professor would again take charge of a party of members and give them another of these charming field lessons in the construction and fitting of the earth.

Pre-Columbian Voyages to America.—By special permission of the Pope, the Archives of the Vatican bearing on pre-Columbian voyages to America were searched for the first time in 1892, and facsimiles of the documents found were exhibited at the Convent of La Rabida during the World's Columbian Exposition at Chicago, and discussed in a paper by Mr. W. E. Curtis, published in the *National Geographic Magazine* for January, 1894. Mr. J. C. Heywood searched for and catalogued the various documents, the most interesting of which are those relating to the Bishopric of Gardar, in Greenland, and to the line of demarcation between Portuguese and Spanish influence. According to Adam of Bremen, who died in 1076, Norwegians first reached Greenland at the end of the ninth century, and the bishopric of Gardar certainly existed in 1124. The settlements on the American continent known as Helluland, Markland, and Vinland, though not admitting of absolute identification, witness to the civilising influence of the bishops of Gardar. Letters of Pope Gregory X. in 1174 show that part at least of America was expected to furnish money for the crusades. The Archbishop of Drontheim informed the Pope that it would take him five years to visit his archdiocese, and six years to collect the tithes. The people, besides, had no money, and no grain or fruit was grown; they could only offer, for the expenses of the crusades, skins and teeth of animals. From a letter of Pope Nicholas V., it appears that in 1418 heathen foreigners with a fleet invaded the country, burned the buildings, and carried off many of the people. Some interesting documents relate to the line of demarcation. The kings of Portugal had for many years demanded from the popes exclusive rights of discovery and colonisation on the western coast of Africa. These demands were granted until they covered all the region from Ceuta around Africa to India. Columbus, believing that he had only discovered a new route to the eastern part of India, Ferdinand of Spain secured three papal letters to prevent any interference with the new claims of Spain. A letter of May 3, 1493, gave to Spain exclusive right to all lately discovered lands, and islands which might still be found if not already possessed by some Christian power. Another letter, dated May 4, gives a definition of the famous line of demarcation; that line is fixed 100 leagues to the west and south of the westernmost island of the Azores. "To the south" was added because the region was particularly desired by both Spain and Portugal. In proposing this line to Pope Alexander VI., the Spaniards only knew that it would fall far from San Salvador, and that it might prevent jealousy on the part of Portugal if Spanish ships were kept 100 leagues from the most western of the Portuguese possessions. But the Portuguese at the same time believed San Salvador to be part of India, to which they claimed an exclusive right. In June, 1494, the demarcation line was moved 170 leagues further west, a change which unwittingly gave Brazil to Portugal. Mr. Curtis's paper contains a translation of the text of all the letters and other documents to which reference has been made.—*Proceedings of the Royal Geographical Society, May, 1894.*

THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY.

SOUTH DEVON AND CORNWALL.

By Mr. J. D. WILDE, M.A., one of the Honorary Secretaries.

(Notes of an Address given to the Society April 18th, 1894. Illustrated with 60 Lantern Slides.)

ONE of the Society's excursions suggested for the coming summer is to the south-western corner of England, and as I have lived some years in that part of the country and made many visits to it since, I have been asked to be the guide on that excursion and to set before the Society this evening a few facts, which may serve the double purpose of showing those who propose to take part in the excursion what the plan of action will be, and of helping a little to enlarge the knowledge of the geography of our own country in the members generally.

The first point to which I would call attention is the map of the district, and the fact that on the map the River Tamar, for nearly the whole of its course, marks the division between the counties of Devon and Cornwall. But there is an old maxim—as old as Imperial Rome—that rivers join, mountains separate; and here is a good example, for the high, rugged mass of Dartmoor, a barrier wall some twenty miles thick, is really the boundary which divides the Britons of Cornwall, or Corn-wales (*i.e.*, Wales the promontory), or, as it was called still earlier, West Wales, in opposition to North Wales—(the Wales of our day)—from the Saxons of Wessex and England generally. This fact obtains some official recognition in that the district of Dartmoor is included in the Duchy, though not in the county, of Cornwall, and the Duke of Cornwall is also the Prince of Wales.

The next point to be noticed on the map is the almost insular position of the district, which, in combination with the

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highlands of Dartmoor, Exmoor, and the Cornish plateau, causes the rainfall to be exceptionally great. Without giving figures, we may quote the Devonshire sayings—

The South wind brings wet weather ;
The North wind wet and cold together ;
The West wind brings us rain ;
The East wind brings it back again.

If the sun do set in grey,
The next will be a rainy day ;
But if the sun in red do set,
The next day will be surely wet.

We have also a royal dictum on the subject, for Charles II., having spent some time at Tavistock, had 'such a lively recollection of the weather there that whenever, in after life, he heard any one remark that it was a fine day, he retorted that it was "certainly raining at Tavistock."

As a set-off to this wet blanket, we may be reminded that there is scarcely a county in England where the sunshine is brighter or more frequent and the climate so warm and mild ; and the combination of wet, warmth, and sunshine gives us a richness of verdure, a brilliancy of colour in the woodlands, and an abundance of wild flowers probably unequalled in our country.

Before finally leaving the map, we should trace our intended route, which, starting at Plymouth—where we spend some little time in studying the neighbourhood—moves inland to Tavistock, Lydford and Launceston, reaching the sea at Boscastle, and going by Tintagel, Bedruthan, New Quay, Truro, Falmouth, Lizard Point, Helston, St. Michael's Mount, and Penzance to the Land's End, from which we need not return to-night.

Plymouth, with its sister towns of Stonehouse and Devonport, forms an interesting beginning of our visit. Few who have not visited the place can realise its peculiar position. The Sound is a magnificent bay, some two miles across by three long, lying between high hills, and closed at its entrance by a breakwater nearly a mile in length. At the other end it divides into three large arms, each of which has numerous smaller ramifications—the estuary of the Plym to the east, that of the Tamar—here known as the Hamoaze—to the north, and the St. Germans to the west. Between the Plym and the Tamar lie the three towns, hidden from the sea by the height called the Hoe, on which stands the old citadel. The Plym estuary and its branches are occupied by the commercial and fishing industries of Plymouth ; the Hamoaze and its branches by the naval activity of Devonport ; the St. Germans—which in the days of the Armada could furnish more ships than Plymouth—is now silted up, and only affords shelter for a few powder hulks and old men-of-war of a past age that have crept

away to die in hiding. The three towns—together less than one-third of Manchester and Salford—are interesting in their individuality. Plymouth contains one fine group of buildings for civil and ecclesiastical purposes; it has a shipping quarter—in which are some quaint old houses well worth the trouble of seeking; a shopkeeping district, which evidently caters for an aristocratic body of permanent residents as well as for tourists; a growing, but necessarily limited, visitors' quarter, which is struggling for a view of the sea; and two large suburbs, in which the gentry reside. Stonehouse consists of the Marine Barracks and the Royal Victualling Yard and their appendages; Devonport, of the Naval Dockyards and shipbuilding yards, with a large artizan population and the shops which are its usual accompaniment. In all three the streets are very steep and mostly narrow.

Our first excursion is by steamer up the Hamoaze, under the great Saltash Bridge, which carries the only (and single) line of rails which connects the greater portion of Cornwall with the rest of England, and is the only bridge across the Tamar until we reach the limits of tidal water at Gunnislake, some sixteen to twenty miles up the stream. It was built by Brunel, and its whole proportions are characteristic of the mind that could not content itself with the railways then in construction, but must plan that broad gauge whose extinction travellers may now regret. Two other striking features of this trip are the dear old house of Cotehele—the home of the Dowager Lady Mount-Edgcumbe—on the Cornish bank, and the towering cliffs of Morwellham breaking through their forest clothing on the Devonshire side of the stream. We also pass the estuary of the Tavy, up which, in Saxon times, the Danes are said to have sailed as far as Denham (? Dane-ham) Bridge. If this tradition is true the Tavy must have become much shallower and more impeded with rocks, or the Danish ships must have been able to sail in little more than a heavy dew.

Not failing to devote a day to the Plym and its tributary, the Meavy—a sylvan paradise, where every yard might employ an artist—we must now make for Dartmoor. As physical geographers we find in this region splendid illustrations of the action of water in forming our landscapes. A high mass of rock, a heavy rainfall and strong winds, resulting in a number of peaks of denuded rock—called Tors—split by weather till it is difficult to realise that they are not artificial strongholds built in some remote period; steep grassy slopes, strewn with the rocks which fall constantly from the tors; and noisy streams, well filled by the frequent rains, carving their valleys deeper and deeper, and rolling the boulders along and grinding them into the sand with which they are filling up the broad estuaries which indent the coast.

One word as to the name Dartmoor Forest, which appears on our maps. Dartmoor may have been—perhaps was—once covered with trees; but the name of forest among our Saxon ancestors meant little more than highlands, and among our Norman lawyers was applied to all lands kept uncultivated and unenclosed for the chase, and subjected to the rigours of the Forest Laws. To-day the woods of Dartmoor are confined to the river valleys, and in them they are very beautiful. In the upper part of the Walkham Valley—a typical Dartmoor stream and a tributary of the Tavy—archæologists find the very perfect remains of a large British settlement, most probably one of the places which were engaged in the tin trade full three centuries before our era; and the placenames and surnames of the people contain many interesting bits of history. Surnames like Cudlipp and Dodge tell us of an influx of German miners (Gottlieb and Deutsch), and perhaps the redoubtable Cobbledicks are a reminiscence of the Kobolds of the Hartz Mountains; while Penny-come-quick (Pen-y-cwm, “head of the valley”) and Danicumbe tell us of the Britons and their Danish allies, against whom the stockade on the Tavy—Tavistock—was erected.*

The Tavy is best explored from Tavistock, which is almost a better centre than Plymouth for exploring the moor. It is a magnified repetition of the Walkham, and the views thrown upon the screen give a better idea of its beauties than any description. But no picture can give an idea of the Lydford gorge, where the Lyd fights its way through a barrier of granite which had blocked its course, and has cut for itself a passage so deep and tortuous that the sunlight never reaches the bottom, and so narrow that a horse can leap across it. The walk, or rather scramble, of nearly two miles along the break-neck path which has been cut and built along this gorge will not soon be forgotten. Lydford Castle, about half a mile from the gorge, is an unpretentious ruin of a single tower, around which hover unpleasant memories of Judge Jeffreys and Colonel Kirke’s Lambs.

Following the Lyd we soon reach Launceston, just within the borders of Cornwall. The church is covered externally with carved stonework, and commands a fine view of Dartmoor. The castle has a large round keep and little else remaining, but occupies a striking site.

From here we travel by coach or on foot to reach the sea at Boscastle, whose serpent-like harbour is so narrow and confined between such lofty heights that the few boats which enter and leave it have to be warped in and out, being totally unable to

* The struggle against the Danes and Britons is not the only one in which Tavistock has taken a prominent part. One of the three members of Parliament against whom Charles I. acted so foolishly was representing this town.

use their sails. Boscastle lies too deeply buried between its hills to detain us, and we hasten along the coast to Trevena, pay a visit to the romantic ruins of Tintagel Castle, and refuse to doubt a single detail of Arthur's mysterious birth and glorious life.

At Bedruthan Steps, halfway between Padstow and New Quay, the cliffs attain the summit of their grandeur; and here, as we notice the fantastic shapes into which each detached mass of rock is carved, the fineness of the sand, the absence of boulders and pebbles, and the weight of the breakers which are constantly rolling in, we can realise what a mighty power is at work, and well believe that the lost land of Lyonesse is not a mere myth.

So far I have written rather fully in order to show clearly the spirit in which the excursion is planned and the lessons it is calculated to teach; to continue with the same minuteness would require more time than a single evening, and more space in the *Journal* than could fairly be granted to a paper of this description. I may, however, add one remark, which should interest all who have thoughts of attempting the journey—that the cheapness of living and travelling in Cornwall compares so favourably with the expenses of a Lancashire watering-place as to neutralise the cost of the initial journey from Manchester to Plymouth. I have done most of the tour here suggested at a cost of less than 10s. a day, inclusive of fare from Manchester; and a party could do it with comfort to its weakest members for little more.



NORMAN CHAPEL, PRESTBURY. See page 249.

THE UGANDA EXPERIENCES OF

MR. F. C. SMITH ("SIMISI"), F.R.G.S., F.L.S.

Communicated to the Society by Mr. J. HOWARD REED, Hon. Sec. (Victorians), in the Large Room of the Chamber of Commerce, on April 18th, 1894.

EARLY in the year 1890 Bishop Tucker, who had been then recently appointed third Bishop of Eastern Equatorial Africa, left England to take up the duties of his bishopric.

Just previous to his leaving this country a party of missionaries, intended for the stations in Uganda and East Africa, had proceeded to Mombasa, there to wait the arrival of the Bishop. On May 5th, while Bishop Tucker was still on his voyage to the East Coast, a cablegram announced to the Committee in London that one of the party who had recently reached Mombasa was seriously ill (he subsequently died), and begged for more men to be sent out. This demand was no sooner made than volunteers were forthcoming, and on May 10th, only five days later, four men left London for Marseilles to catch the French mail-boat. These four gentlemen were Messrs. J. W. Hill, B.A., J. W. Dunn, J. V. Dermott, and Mr. F. C. Smith, the last-named of whom is now the only survivor of the party.

The new comers having arrived, the whole party assembled at Zanzibar under Bishop Tucker and crossed over to the mainland in July, leaving the coast for the interior a few days later. Mr. Hill almost immediately fell ill, and was consequently sent back to Zanzibar, where he succumbed on July 20th, making the first gap in the party of four who had left home so full of hope only two months previously.

In due time the party of travellers reached Usamiro, the Church Missionary Society's station at the south end of Victoria Nyanza, they having travelled through German territory by way Mwapwa, Ugogo, and Unyamwezi. On November 13th the second of the four volunteers, Mr. Dunn, died of fever. He was buried by his companions in the little missionary graveyard where the remains of Bishop Parker, Mackay, Blackburn, and Hunt had been previously laid.

On December 4th Bishop Tucker, accompanied by several missionaries, one of whom was Mr. F. C. Smith, commenced the voyage across the great lake to Uganda.

Mr. Dermott was left behind at Usamiro, and a few weeks later proceeded to the Society's station at Nassa. He there laboured until April, 1892, but in that month died of fever after three weeks' illness.

Thus we find that within two years three men had passed away out of the four who, in 1890, at five days' notice, gallantly left their homes to follow Bishop Tucker to Central Africa.

Mr. Smith, on reaching Uganda with his Bishop, was detailed for service in Usoga, and we may notice that in April, 1891, his letters are written from Wakoli's village in that country. While labouring in Usoga Mr. Smith, on one occasion at least, ran a very narrow chance of losing his life. Wakoli, the chief of the district, was shot, either by accident or design, by one of the camp men during the process of gun-firing which was being performed, in the African manner, by way of welcome to the chief, who was returning from some expedition. The man who fired the shot was immediately hacked to pieces by Wakoli's followers, and in the excitement a

general rush was made for the white man. By putting on a bold front and by sticking close to the wounded chief, who, in spite of his serious wound, did his best to protect his white friend, Smith ultimately escaped. He was, however, frequently struck by the people, many of whom tried their best to kill him, and only got clear after losing his hat, coat, boots, and socks, and having his pockets rifled. With the aid of the wounded Wakoli, and that of the mother and wives of the chief, the missionary was able to put himself out of danger. He returned, however, to the assistance of Wakoli with medicines, but in spite of his efforts the wounded chief succumbed to his injury some twenty-four hours after receiving the wound.

In August, 1892, Dr. Gaskoin Wright, of Salford, who had gone to Uganda with the Rev. R. P. Ashe some time previously, was taken seriously ill, in consequence of which he was ordered home. Partly on account of his own health, and partly as a travelling companion for the sick doctor, it was decided by the other missionaries that Mr. Smith should accompany Dr. Wright to England. Leaving Uganda they crossed the lake, arriving at Mwanza, on the southern shore, on October 14th, 1892. After visiting Nassa, they travelled to the coast by way of the German road, reaching London on January 17th, 1893.

From the report of an address on his Uganda experiences, given by Mr. Smith at Newport, Isle of Wight, in January last, and from some extensive notes kindly placed at my disposal by Mr. Smith, I have been able to compile the following :—

The party of missionaries, of which Mr. Smith formed one, travelled to Lake Victoria, by what is known as the old route, through German territory, from Sadaani—opposite Zanzibar—to Usamiro. The journey of about 800 miles occupied some three months, and only twice during that period could they obtain clean water to drink, and sometimes water of any kind was so scarce that they had to wash themselves with tea-leaves after they had done duty in the teapot.

On one of the occasions referred to, Mr. Smith says they met with clear, good water, which was drawn from some extraordinary and deep wells, in the very midst of the "Mgunda Mkhali" (Fierce Forest). Here some of their men fought for the water, and, as a result, three natives fell into the wells, and no possible steps could be taken to recover their bodies. This kind of thing, he says, not infrequently happens now with the German caravans, and on his own homeward journey, at the end of the dry season, the stench of the water was so loathsome that they could not endure to have it brought near their tents. For fifty miles they marched on just as little liquid as could keep them together during two days' forced travelling. The second occasion on which they obtained clean water was when a welcome storm broke over them. On all other days they had water charged either with sand, mud, or decaying vegetable matter.

At Mkhali, not far from Mamboia, the water, Mr. Smith says, is most tantalising, for, although beautifully clear, it is intolerably bitter, and by certain lights falling upon its surface iridescent hues are displayed, somewhat like those upon water tainted with tar. "I always pronounced it," he says, "the most galling cheat I ever knew, for should you rashly indulge in a draught its effect is in more senses than one not unlike that of Epsom salts." Is it any wonder that the death-roll of travellers in Africa is so terrible? How long would people in England live under such conditions? There were 30 graves of travellers on the road, whose deaths were largely due to the difficulty of finding water and shelter. The white women buried on this route have in all cases died through child-birth, and this, Mr. Smith says, affords sufficient explanation why ladies cannot as yet advance to Uganda.*

* The Church Missionary Society now contemplate sending specially selected ladies to Uganda by the English route.—J. H. R.

Other troubles occurred in connection with their porters ; and besides these there were attacks by robbers, most of whom, however, had a wholesome fear of a white face. Their food on the journey consisted chiefly of ground millet made up into a mess resembling stiff barley-meal, though sometimes they were fortunate enough to get a little rice and some coarse honey.

On the southern route attention is constantly drawn to large logs of wood fixed in the trees. On examination it is found that each log is cut through the middle from end to end, the inside being hollowed out, while at each end an aperture is made, through which bees may pass. The whole forms a simple but effective beehive, within which the bees construct their comb. The honey is coarse, because it is usually brought for sale with larvæ, sticks, comb, &c., in one general mess, which you remedy by a slow process of boiling. The logs, or hives, are called "Mzinga" (Mizinga plural), which is also the word used for cannon. Mr. Smith says honey is not obtainable in Uganda, but this, apparently, is only because the people do not care to collect it. Captain Lugard tells us that, although honey is more or less collected throughout East Africa, the natives make no use of the wax, which is thrown away as useless. This may in the future become a valuable article of commerce.*

Usambiro is described as a wretched station (since utterly abandoned), situated at the termination of Muleshi's Creek, at the south end of the Victoria Nyanza. It will be remembered that it was at this place that Stanley and his expedition rested, and were received by Mackay, on their journey to the coast after the rescue of Emin Pasha in 1889. Mr. Smith explains that they ascertained from enquiry that Mackay's chief reason for settling here was due to the compact of "blood-brotherhood" (a proceeding now disallowed by the Church Missionary Society), which he made with the chief. This ensured to him (Mackay) a stay, which was unmolested by the annoyances which only a pioneer at that period could fully understand.

Mr. Smith says : "We remained at Usambiro two months, and it was a most disastrous delay to us, for within that time we buried, beside Bishop Parker and Mackay, the mortal remains of two of our companions, while Bishop Tucker, and Messrs. Pilkington and Baskerville only escaped by 'the skin of their teeth.' It seldom falls to the lot of one strong man to see such utter wrecks of manhood as my companions then were."

It took them one month to cross the lake from the south to Uganda, the whole journey from the coast, owing to their many difficulties, taking no less than six months, although without such hindrances, Mr. Smith thinks, three months would be the approximate estimate of time required for the journey.

Mr. Smith gives a glowing account of the beauty of some of the islands in the lake, and thinks the English are particularly fortunate in the portion which falls to their share, the beauty of which is indescribable, the scenery combining all that is best of an English spring with the finest tints of an English autumn. He says : "Neither the value of such a vast amount of fresh water, in such a situation, nor the beauty of the vegetable kingdom can, in my opinion, be overrated." The bird and animal life is very wonderful, the birds outdoing in point of numbers any idea he had ever formed. "My surprise," he says, "was not small at seeing innumerable gulls, terns, and cormorants, such as one had only thought of in connection with the ocean of salt water."

There are splendid fish, fine, abundant, and good, in the lake. And there are also very many hippopotami, to which it is necessary to give a wide berth. The natives sometimes organise hippo. hunts. When they are fortunate enough to make a capture, a great stage of logs and branches is erected on the shore. The carcase is

* Beeswax is already exported from British Central Africa (Nyasaland).—J. H. R.

then cut up into junks, which are placed on the stage, under which a wood fire is kindled until the meat is smoked, after the fashion of our bacon, but the odour of the one is not so desirable as that of the other. The hippopotami, Mr. Smith says, are being ruthlessly slaughtered on all sides.

Uganda itself is about one hundred and fifty miles long and about fifty broad. It is divided into ten provinces or counties, whose individual names—Singo, Chagwe, Budu, &c.—are oftener heard than that of Uganda itself. It is a country of hills and marshes, and if one went on to St. George's Down, Isle of Wight, and closed his eyes to many English features, he could imagine himself in Central Africa. Mr. Smith says that when he was away there and fell into a dreamy state he often forgot that he was in the Dark Continent, so that if any one had spoken to him in the broad Isle of Wight dialect he would not have been surprised. With regard to the climate, although the heat in the daytime is dangerously intense the nights are very cold; they always had fires in their huts, and slept in blankets.

The fires are kindled on the floor, which is simply of hard beaten earth. The Europeans prefer the fire about the middle of the room, whereas the natives have a spot in the hut set apart for a fireplace, which may be in the middle, although more usually it is on the inner side of the circular or rectangular wall of reeds. The natives spread their huts with a special kind of grass, but, since it harbours multitudes of fleas, Europeans carefully avoid such a carpet. To all strangers in the country, Mr. Smith says, it is a marvel how comparatively infrequent are the cases of house-burning.*

Many people, says Mr. Smith, have an idea that the centre of Africa is a barren desert, but the fact is that around Uganda they have abundance of rain all through the year, and, as a consequence, perpetual verdure. From its neighbourhood, near to the Equator, the days and nights are of equal length and there is perpetual summer, and he supposes the latter fact accounts for much of their suffering—there is no resting time as there is in a temperate climate, and those who grumble about the severity of an English winter would be very glad to get back to it after a few years' experience of perpetual summer.

The people are Negro in type—black, with curly hair, but not of the thick-lipped West African variety, and Mr. Smith says one grows to like them very much and to get so accustomed to them that there seems something odd about a white man when one is encountered.

It is no very rare thing to see pure albinos amongst the natives. They seem to be regarded as something "uncanny," and apparently obtain more than the usual amount of respectful attention. The appearance of the skin is not pleasing, being, Mr. Smith says, almost exactly that hue which is to be noticed in the skin of white pigs.

Speaking of their employments, he says the men manage the politics, build the houses, carry out the naval and military expeditions, make pottery and soap, catch fish, and attend to the cattle. The women look after the wants of their lords generally, cook the food, and cultivate the ground, the last-named occupation being relieved with intervals of smoking. The women never wash the clothes—this duty is always entrusted to the boys, and very proud they are of their successful efforts. One of the greatest troubles of his life was fleas, and so plentiful were these pests that the natives often smoke their clothes as the only way of getting rid of them. The dress of the people is a native cloth beaten out in a surprising way from the bark of a fig tree, but

* While this is in the press, news comes to hand of the destruction by fire of the whole of the stores, books, and private effects of the missionaries in Mengo, Uganda—a loss of some £2,000 worth of property.—J. H. R.

there is now a great tendency, especially among the men, to adopt English material and English fashions. For washing the person they use a kind of sponge made from the banana stem, and they are very punctilious about washing their hands before and after meals. The staple article of food is boiled bananas for the rich, and sweet potatoes for the poor people. For relishes there are tomatoes and onions, which have been successfully introduced to the country, and beans and vegetable marrows, which are indigenous. Mr. Smith says he has recently sent out peach and nectarine stones, and ivy and holly berries, which, he trusts, will grow successfully. Fowls, the flesh of goats and sheep—these two so lean that it is difficult to distinguish between them—so-called beef, fish, and butter (made in gourds by a process of shaking by the boys) form part of their bill of fare; while luxuries of a character quite strange to an Englishman are found in white ants and locusts, the latter reminding one of shrimps, and both being very good. Coffee is also an indigenous production, and is much prized by the people, who show their politeness by offering in a basket some of the hard berries to their visitors. This custom, he says, finds its exact counterpart in our fashion of afternoon tea-drinking. The natives of Uganda are also becoming fond of a cup of tea. When the country becomes developed, coffee will, he believes, become an important article of commerce.

There are many insect pests—swarms of house flies, gnats in such thick clouds at the lower end of the lake that people catch and eat them, and ants that are a perfect terror, one sort (Siafu) attaching themselves so firmly to your flesh with their jaws that if you try to detach them you pull off their body and leave their heads behind.

The advanced state of the people compared with those around them is shown in many ways. Instead of sleeping on the ground they construct and use very effective bedsteads, they make chairs and stools with joints instead of cutting them out of a solid piece of wood; their smith's work is excellent, and they are especially clever at basket work; so much so that a missionary who had learnt that industry before going out on purpose to teach it to the natives was quite ashamed of his own work when he saw theirs. They have elaborate codes of etiquette and politeness. Their desire for reading is very great, and he is glad to say it is chiefly in the direction of a wish to study the Bible; and it is most wonderful how Uganda is losing its old heathen customs, so that it can now claim to be a truly Christian country. Mr. Smith knows King Mwanga personally very well, and was much impressed with the ceremonies observed at his court. Twenty years ago people were being killed wholesale, but now the government is practically elected by the people, and they have a parliament, rude as it is, instead of a despotic monarchy—in fact, the conditions of the country are much like our own when the feudal system was at its height.

A. Caucasian Guide Book.—Mr. Douglas Freshfield, with the assistance of Mr. Mummery, Mr. Woolley, and other recent travellers in the Caucasus, has in preparation a Climber's Guide to the portion of the Caucasian chain between Kasbeck and Elbruz. It will contain a complete table of routes from England, with time tables, cost, and a selection of routes to the mountain centres from the chief towns on both sides of the chain, as well as such details as to the topography of each district and the expeditions already accomplished as can be collected from mountaineering journals. Four district maps will be given, and probably a few outlines from Signor V. Sella's panoramas. As two of the maps, originally produced for the Royal Geographical Society, have been taken off the stone, the edition will be necessarily limited to 150 copies. It is hoped that the book will be issued in the spring of 1895.—*Proceedings of the Royal Geographical Society, May, 1894.*

THE TIDAL WAVE IN THE WYE AND SEVERN.

COMMUNICATED BY MR. H. C. MOORE,

And read to the Society in the Large Room of the Chamber of Commerce on
Wednesday, April 18th, 1894.

THE height of the tidal wave in the river Wye has been so variously stated, and warmly disputed in both hemispheres, owing to the conflicting statements that have been published, that it is considered that it would prove of interest to many to place upon record, for the sake of comparison, some of the older as well as the more recent observations upon the subject.

The tidal wave up the Wye is so high that I have never yet heard any contradiction of the statement that, with the sole exception of that in the Bay of Fundy, in Nova Scotia, it is the highest in the world. I am informed that Sir Charles Lyell represented it as reaching so high as 70ft., but whether that was the result of his own observations or given upon the authority of some unnamed old local guide book from which the present guide books cull the same statement without vouching for its accuracy, I know not. The statement on record is to the following effect :—

"In January, 1768, it rose 70ft." However much we may be inclined to doubt this, we must nevertheless admit its possibility, because, independently of tidal action, it might have been influenced by earthquake action. Sir Henry De La Beche informs us that the Cornwall coast was affected at the great earthquake of Lisbon in 1755 with a rise of 8ft. to 10ft. of tide, and so recently as 1866, the lighthouse keeper at Skerryvore reported a sudden wave more than 20ft. in height occurring at low water on a bright autumn morning.*

In Beatties' "Castles and Abbeys" we read that "in March, 1815, the tide rose from low water mark to the remarkable height of 51ft. 2in."

At a meeting at Tintern Abbey on July 27th, 1880, Dr. Yeats informed us that the highest tide he had known was 44ft. Again, in his address to the members of the British Medical Association on August 1st, 1885, on their excursion from Cardiff, he informed them that the statements in *Nature*, 1879, April 3rd and 16th were reliable, and that the height of 44ft. was allowed as the highest tide in regulating the point of suspension for the Great Western Railway Tubular Bridge in 1846—1847.

It is very satisfactory to learn that since the period of our visit to Chepstow, and we may claim due to our visit, this subject has received careful attention under the hands of Mr. F. H. Worsley-Benison, of Livingstone House, Chepstow.

On September 8th he was engaged with Mr. Atkins, the town surveyor, and Mr. George Sargent in testing and proving the actual height of the tide in the Wye at Chepstow. They took the height, at the bridge, between lowest water, the lowest tide of the month, and the mark made in Mr. Sargent's coalyard to which the tide rose on October, 1883, and found it to be 52ft. 5in. On further testing the average springtides they found them as near as possible 50ft.

The 1883 October tide is, with one exception, the highest ever known. That exception was six inches higher. Mr. Worsley-Benison writes to me as follows : "At the 'Anchor' Inn, Tintern, an inn close to the landing place, the 1883 tidal mark is distinctly shown about 5ft. up the kitchen wall. The late owner who had lived there all his life, as also his father before him, has told me on more than one occasion

* At the period of the earthquakes which affected Wales and the West of England on August 18th and on August 22nd, 1892, a remarkable tidal wave occurred in the river Dart on August 17th, and recurred several times on the 19th.—(August 28th, 1893.)

that the tide of last century was 6in. higher up the wall." Mr. Worsley-Benison has brought the matter before the Local Board of Chepstow, with the suggestion that a plate recording the height of the October, 1883, tide should be fixed on the bridge, and also the height of high spring tides.

The following correspondence has been taken from *The Chepstow Advertiser* of October 14th, 1892 :—

Livingstone House, October 8th, 1892.

DEAR SIR,—Allow me to submit the enclosed letter respecting the tide of the Wye to the notice of the Local Board, and to suggest that under their sanction a plate of some suitable metal be fixed on the bridge bearing a record of the height of the October, 1883, tide, and a deeply cut line indicating the level to which it rose. The height of the high spring tides should also be named. I think the fact that the October, 1883, tide being one of the highest known, and the Wye being the highest tide with one exception in the world makes the event extremely interesting, and well worthy a permanent record. The subject of the tide is always an interesting one to visitors. It is doubted by some that the October, 1883, tide rose sufficiently high in the Anchor Inn at Tintern to float the stone filter off the kitchen table. I had the statement on more than one occasion direct from the late Mr. Bowen himself, and he has often pointed out the beading of the panelling as the exact point to which the water reached. It must be remembered that the amount of "fresh" in the river of that time was very exceptional. The depth of water in the Bridge Inn on that occasion was just 22 inches.—Believe me, sir, yours faithfully,

F. H. WORSLEY-BENISON.

To Mr. S. Jones, Chairman of the Chepstow Local Board.

Following is the letter above referred to :—

To the Editor of *The Standard*.

SIR,—The height of the tide in the river Wye has always been, I believe, an undecided question. The subject is an exceedingly interesting one, from the fact that this tide is the highest but one in the world, Fundy Bay being the highest. Through the assistance of Mr. Atkins, the town surveyor, and Mr. George Sargent, I am enabled to send you notes of the measurement of the average spring tides, and also one of the highest tides on record—that, namely, of October, 1883. The level of that tide was marked in one or two places. Dropping a surveyor's chain over Chepstow bridge on the afternoon of the 8th instant, the distance between the surface of lowest ebb tide and the marks of October, 1883, was found, after very careful levelling and measuring, to be 52ft. 5in. This tide, aided by an exceptional amount of "fresh" in the river, rose sufficiently high at Tintern, twelve miles from the Wye mouth, to float a stone filter off the kitchen table in the "Anchor" Inn. Another exceptional tide occurred last century, which was six inches higher. Probably the greatest ever known happened in 1606. On the wall of the chancel of Goldcliff Church, near Newport, is a brass plate, bearing the following inscription (exactly copied) :—

"1606.

"On the xx day of January, even as it came to pas, it pleased God the flud did flow to the edge of this same bras, and in this parish there was lost 5,000 and od pounds, besides xxii people was in this parish drown—Goldcliff.

"John Wilkins, of Pilrew, and
"William Tap, Churchwardens."

"1609."

Of course these tides are phenomenal. The average high spring tides at Chepstow reach, but do not exceed, 50ft.

I am, sir, your obedient servant,

F. H. WORSLEY-BENISON.

Livingstone House, Chepstow, September 27th, 1892.

Thus far had this our present volume of *Transactions* of 1892 been printed when, in order to make doubly sure of having all correct up to date, I fortunately referred this subject once more to Mr. F. H. Worsley-Benison. I was unaware of the matter being otherwise than at rest for at least another century. An explanation of the *status quo* will be more briefly rendered by publishing the correspondence which has taken place on the subject since Mr. Worsley-Benison's letter of September 27th, 1892, to the *Standard*. An additional reason for publishing the correspondence is because every line of the letter of Mr. James G. Wood is stamped with a character of much accuracy in detail, and because the information gleaned from it, being based upon the sound experience of extended observation, is more valuable than such loose statements as—"some old man told me," or "it is reported that"—such as we often have to be satisfied with.

TIDE IN THE WYE.

To the Editor of *The Standard*.

SIR,—The question of the true height of these tides (undoubtedly the highest in the British Isles) is of far more than local interest, and I therefore trust you can afford me space for a few remarks on Mr. Worsley-Benison's letter in *The Standard* of September 29th, 1892, which my then distance from books and papers prevented my dealing with before.

I regret that I cannot accept Mr. Benison's figures, or his deduction that "the average high spring tides reach, but do not exceed, 50ft." From 1845 to 1853 the tide in the Wye was under the daily observation of the engineers then in charge of the construction of the great railway bridge over the river. A letter now before me from one of these gentlemen, dated 1st October, 1869, says: "I took the level of the great flood in January, 1846, at the doorstep of a shop at the corner of Bridge Street and St. Ann's Lane. The height of that doorstep is 46'84ft. above low water of spring-tides; and the flood of January, 1846, was 0.26ft. above it, making 47'10ft. as the extreme height of that unusual tide. Thomas Waters, aged 80 in 1849, remembered rowing a boat up to this step in or about 1799; then the water was about one foot above this doorstep, which would be a rise of 47'84ft. The doorstep of the Bridge Inn is 45'42ft. above the datum of low water, and there is a mark in the kitchen of the inn, representing the flood of 1846, which is 1½in. higher than my own well-authenticated marks."

This shows that, during the first half of this century, what Mr. Benison treats as the average was never reached. The places mentioned still exist, one two hundred feet from the other, close to the Road Bridge. If in October, 1883, the tide rose as Mr. Benison says, 52ft. 5in., it must have risen 7ft. above the inn doorstep, and wrecked all the lower part of the town. I know from information received at the time that it did not.

The piers of the Road Bridge rise forty-six feet above the bed of the river, the point from which this measurement is taken being thirteen feet below the edge of the foundation on the Monmouthshire side. The point in Bridge Street to which I know the water flowed on the 17th of October, 1883, is (by Ordnance levelling) 6'55ft. above the piers, or 52'55ft. above the bed. Mr. Benison's figures would require that

the river ran dry at ebb. There is never less than 4ft. or 5ft. over the bed at the point in question. Besides, he says that at the time there was a great deal of fresh water coming down.

For many years I marked every high spring-tide at Chepstow. Of the twenty-six spring-tides in a year nearly all would cover the piers. A few would rise 3ft. or 3ft. 6in. over them, in some years 4ft. or 5ft. would be reached, but I never knew the level of 1846 to be afterwards reached. The tide of October 17th, 1883, to which Mr. Benison refers was anomalous.

The late Mr. Thomas Walker, in his work on the Severn Tunnel, says that the water in the Severn Tunnel rose 10ft. above its calculated height, "and it must have come on as a solid wall of water 5ft. or 6ft. high," and speaks of it as a "great tidal wave." Such a phenomenon is due to causes other than those which produce tides; and its effects, whatever they may have been in the Wye, should not be taken into consideration in determining the height of extraordinary tides in the latter river. Even, therefore, if Mr. Benison's figures be right, they do not help to the solution of the problem.

In any case, it is not accurate to compare the height of the tidal wave of 1883 with the lowest ebb of 1892 (as he professes to do), and treat the difference as a measure of the tide-flow. Text books have asserted, and some still assert, that the Wye has a tide of 60ft. or even 70ft. I have yet to be convinced that 50ft. above the ebb level has ever been reached, tidal wave or no.—I am, sir, your obedient servant,

JAMES G. WOOD.

Lincoln's Inn, October 13th, 1892.

THE TIDE OF THE WYE.

To the Editor of *The Standard*.

SIR,—The interesting letter in *The Standard* of yesterday, September 29th, on this subject brings to my recollection the elaborate and beautiful drawings and details of this bridge prepared by my friend Mr. Samuel Hughes, civil engineer, about fifty years ago, for which the most careful measurements and levels were then taken.

I have now in my library the book, in four volumes, in which these were published by Weale, entitled "Bridges, Construction and Theory," with treatises by Professors Hann and Hosking. The rise of the tide there shown is 44ft. 5in. from ordinary ebb to ordinary spring-tide level, or 8ft below the exceptionally high tide of October, 1883. As this tide would be at least 2ft. above the top of the iron palisading on each abutment of the bridge it would be well to know what the results of this flood were in the houses on the Monmouthshire side, which stand very considerably below that level.—I am, sir, your obedient servant,

Liverpool, September 30th, 1892.

THOMAS D. BARRY, Civil Engineer.

These letters have caused a re-examination by Mr. Worsley-Benison and his party of their previously recorded heights—and have resulted in the discovery that they had made an error in excess.

We may now consider this question finally settled by publishing the following letter to the Editor of *The Standard*, which appeared in that paper in its issue of Friday, September 8th, 1893:—

HEIGHT OF THE WYE TIDE.

SIR,—In September of last year I sent a letter to *The Standard*, purporting to give a correct statement of the height of the tide in the river Wye. The correctness of the figures given was challenged in a reply letter from Mr. James G.

Wood. I now find, through an unaccountable error made in taking the measurements I relied on, that my figures were wrong, and those given in Mr. Wood's letter correct. I am sorry it has been impossible for me to rectify the error at an earlier date. It was only on the 29th ult. I was enabled to verify Mr. Wood's statement that "The doorstep of the 'Bridge' Inn is 45'42ft. above the datum of low water"—the point to which the high-spring tides reach.

Our recent measurements are practically the same : but if they were to be made when the tide is absolutely at its lowest—say, the lowest ebb of an October spring-tide—then the distance between the two extreme levels would be fully 46ft. The question may now, I think, finally rest with complete reliability at 46ft. as the rise of the highest spring-tides in the Wye at Chepstow. The October, 1883, abnormal tide was 22in. above spring-tide limit. I shall feel obliged to those editors of scientific and general papers who will publish a reprint of this letter, and thereby assist me in making an important correction respecting a very interesting but much disputed subject.—I am, sir, your obedient servant,

F. H. WORSLEY-BENISON.

Livingstone House, Chepstow, September 7th, 1893.

The best method of examining the cause, and tracing the course of this gigantic tidal wave is obtained by placing oneself in front of a large scale map of our South-western coast, such as you will find in the Official Time Tables Book of the Great Western Railway, or better still on the walls of any of their important stations. Commencing at the opening of the Bristol Channel, the mouth of the funnel from St. Ives' Bay in Cornwall to the Pembrokeshire coast presents an opening of about 100 miles. From St. Ives' Bay to Ilfracombe, north of Bideford or Barnstaple Bay, the coast line extends from seventy to eighty miles in a north easterly direction, whilst the direct distance eastwards from St. Govan's Head on the Pembrokeshire coast to the Gower Coast line south of Swansea is only forty miles. The width of the funnel from this coast to Ilfracombe is already reduced to twenty-five miles ; still proceeding another forty miles eastwards up channel, it has contracted to ten miles between the coast line below Cardiff to Weston Super Mare ; a third measurement eastwards of forty miles terminates at the Old Passage from Aust to Beachley Point from 1 to 1½ miles wide, and the mouth of the Wye from Beachley Point to the Monmouthshire coast at Mathern is but little more than half-a-mile wide.

It will be observed from the configuration of the channel that a large volume of the tidal wave must be deflected from its much longer southern side by currents impinging upon its northern coast, and if measured in a direct line along the shorter northern shores the tidal wave has, in the distance of one hundred and twenty miles, become narrowed from one hundred miles to less than two miles, or to a width of but little more than half-a-mile at the mouth of the Wye. The rocks at Aust on the southern side of the channel and the rocks at Beachley Point (where formerly stood a chapel dedicated to St. Tecla, said to have been erected in A.D. 47 and existing in Leland's time, temp.* Henry VIII.), protrude far into the Severn, by their obstruction deflecting the current and impelling the flow with increased velocity up the Wye, whose mouth has suddenly to receive a large volume of water. The numerous horse-shoe bends of the first ten miles and the contraction near Chepstow to a width of little more than a hundred yards, all tend to retard its progress and to raise the waters into a heap, thus accounting for the very high tidal wave at Chepstow.

In the Bay of Fundy the tide comes in from 9ft. to 12ft. high, and vessels not anchored with their heads to it are smashed to atoms. In the *Historical School*

* "The Ferry from Auste to a village on the farther ripe of Severn not far from S. Terendacæ Chapel yn the mouth of Wy river is iii myles over."

Geography, by Dr. Morrison (1888), the rise of the tide in Fundy Bay is given as 70ft., and at Chepstow at 60ft. In the next edition we hope to see the latter revised to 46ft.

Let us now trace the tidal wave as it sweeps up the river Severn.

THE BORE OF THE SEVERN.

The width of the Severn at the "New Passage"—from Aust to Portskewet, superseded in 1886 by the Severn Tunnel, is $2\frac{1}{4}$ miles. The width at the "Old Passage" from Aust Cliff to Beachley Point is $1\frac{1}{2}$ miles. At Sharpness the width is about three-quarters of a mile. Above Sharpness, where the banks rapidly converge at the bend which is crossed by the Severn Bridge, the tidal wave rushes up the river at the rate of twelve miles an hour, creating, at spring-tides, the curling-wave of the "bore," stretching as a wall, crested with white foam, right across the channel, here three-quarters of a mile in width. The height of the bore depends upon the phase of the moon, and only occasionally appears at its grandest, being highest at what are called the "palm tides" in the month of March.

The height of the bore also varies with the width of the river, running up at Newnham, where the river is about one mile wide, with a wave 6ft. high, and on some occasions, very much higher; moreover, it is increased in size if the wind—south-west—be blowing in the direction of the channel currents, which may be impressed upon the recollection by the remark of Mr. Frank Buckland's facetious friend, "You may always expect a good 'Bore' if it is accompanied by a *Sow*-wester." It is in some places succeeded by a second, and even by a third bore.

The cliff, about 70ft. high on which the Church of Newnham-on-Severn is built, presents a good locality whence to view this phenomenon as it curves along the horse-shoe bend of the river. Another excellent spot is near Oakle Street Railway Station much nearer to Gloucester, where the river has become much narrowed and can be readily reached by a short walk from the Station.

I have known visitors from Hereford who, becoming aware of the early hour of the tide's occurrence, have started by the 6.30 a.m. train for Gloucester, having obtained permission from the railway authorities to be set down at Oakle Street Station. They have been enabled to witness the phenomenon of the crested wave with sometimes an accompanying precipice of water on each side, and (after breakfasting at the local inn) to reach home on their return before eleven o'clock.

The roar created by the bore, "the voice of many waters," can be heard, especially in the stillness of night, at a long distance,

"And rapid Severn's hoarse applause resounds;"

notwithstanding which, the watchword, "Flood, oh!" is, upon its approach, passed on from bargeman to bargeman.

Mr. Frank Buckland, in his "Log Book of a Fisherman and Zoologist," page 300, gives the report of Mr. James Miller, junior, of the Salmon Fishery, Newnham, upon the Severn bore. He says: "When it happens that the low water lies round the Frampton side and the Noose sands is high, so that the tide has a long roundabout course to go, then there is always a very big "bore" at Newnham in spring-tides. I think it is mainly caused by the great body of water being for a time kept back by the Noose sands, till, rising higher, it suddenly bounds over and joins the current on the Frampton side at a place called Hock Cut, both currents, after meeting in wild confusion, sweeping up the river with renewed vengeance. Should there be a low-water channel through the Noose sands, close to the Awre side, then there is rarely a "bore" of any size at Newnham, the tide having a straight

course upward. It is always in a fresher season that the channel cuts down the Frampton side; and in a dry summer the up flood tide cuts a low way in the Awre shore through the Noose. No "bore" takes place in the Severn below Sharpness Point (except on very rare occasions), and it is not of much size till it gets up in the Frampton Channel. . . . The rise of the tide in the Bristol Channel is so extraordinarily fast that it will have begun ebbing at Kingroad before it reaches Newnham; and as it only flows one hour and twenty minutes at Newnham, where the river is about three-quarters of a mile wide, and rises sometimes nearly twenty feet, you can have some idea of the strength of the tide." . . . "That same tide, after passing Newnham, may flow nearly to Worcester, a distance little short of forty miles, going over the Tewkesbury weir, and expending itself at Diglis, just below Worcester."

Another interesting phenomenon at Chepstow is

A WELL INTERMITTING INVERSELY WITH THE EBB AND THE FLOW OF THE TIDE.

This intermitting well, which fills with the ebb and sinks with the flow of tide, is situated close down by the bridge in the garden of Woodfield House. Its depth is given as 32ft., and it is said to contain often as much as 14ft. of water. It is recorded in every guide book appertaining to Chepstow, and although the truth of what is stated has often been questioned, no one has any longer any reasons for entertaining the least suspicion of doubt. With the object of testing the accuracy of its intermitting properties inversely with the tide, by pre-arrangement Mr. Sargent has stood upon the base stones at its very bottom awaiting the signal from a friend above, to be given upon the movement of the turn of the full high tide. Upon the signal being given, Mr. Sargent observed the clear, perfectly fresh water commencing to cover the basement stones. As the tide continued to ebb so did the water in the well continue to rise. When the tide is completely out the well is full—and, inversely, when the tide has risen full the well is empty!

It is well known by African travellers that natives of desert regions often find water by digging in the soil with their hands alone, such water being the accumulation of the water-fall during the rainy season upon neighbouring elevations. I will now give evidence of a parallel case of fresh water accumulated in a basin fluctuating inversely with the tide, which I would not have believed had I not witnessed it daily.

During the years 1858-1861 I was engaged in the capacity of Lieutenant of Engineers in building the fortified lighthouse and several other works on the island of Perim, in the Straits of Bab-el mandeb, at the mouth of the Red Sea. On January 8th, 1861, the Arab contractor, Hassan Ali Rijib Ali, reported to me that the existence of drinking water on the island was known to the fishermen who occasionally brought their canoes over from the Arabian coast. Somewhat incredulous I visited the reported site at the north-west extremity of the island, and by simply digging with my hands in the sands near the sea coast I saw, obtained, and tasted, some water which to my intense astonishment was drinkable.

On the following morning, January 9th, I took about fifty of the company of Bombay Sappers and Miners accoutred with shovels, and directed the sinking of numerous very shallow wells, varying from 3ft. to 10ft. in diameter. In the course of a few hours at least a thousand gallons of water were exposed to view which, if it could not be reported thoroughly free from saline constituents, was at least drinkable. On the evening of the same day I took my colleague, Lieut. Mortimer (now Colonel), of the Bombay Artillery, to the spot, with the promise of showing him this great discovery. Imagine my intense disappointment at finding all the wells empty! On the next day more wells were made with the same favourable results,

and on visiting them in the evening they were again found empty. The water occupied a basin extending for about 200 yards along the sea-coast, at a distance of only 20 yards to 100 yards from the reach of the high-water mark. The fresh water in this basin flowed and ebbed *inversely* with the tide. This was an extraordinary find in an island where, upon the average, rain fell once in three years! It could not be due to anything else but the accumulation of rain-water from the last shower of rainfall.

Considering the fact that several thousand rupees had been spent in a fruitless search for drinking water by well-sinking, etc., ever since the occupation of the island five years previously, I looked upon this discovery much in the light of the discovery of a gold mine, and reported it officially to the acting Political Resident at Aden, Colonel R. L. Playfair, R.A., taking care at the same time to report the transitory condition of the properties of the water as fit for drinking purposes, namely that it daily became more and more saline in character, such salinity being accelerated by the salt sea sand from the beach falling into it, or being blown into it. Nevertheless, the extraordinary fact remains that *fresh* water in these wells fluctuated *inversely* with the tide, floating, as it were in a basin, on a bed of *salt* water, and that on any day fairly drinkable water in large quantities could be obtained at least temporarily by digging on the sea beach.

It will be apparent that the fluctuation *inversely* intermittent with the tide can only be due to the period required for filtration through the bed of sand.

POSTSCRIPT.

By JAMES G. WOOD, M.A., F.G.S., F.R.Met. Soc.

HAVING through the courtesy of Mr. Moore been favoured with an early perusal of his paper, I have further to acknowledge my indebtedness to him for being allowed to supplement it with a few observations.

To get rid at once of the personal element, and to justify my having appeared to speak as if with some authority, I may say that my acquaintance with the Wye began in 1852; that from 1854 to 1864 the windows of my old home overlooked Chepstow Bridge; and during those and many subsequent years my aquatic pursuits led me to observe the tides with much precision; and later on until recent years I was a constant visitor to the place, and kept closely in touch with everything of interest that occurred there.

1.—THE HEIGHT OF WYE TIDES.

In my letter to *The Standard* I avoided, as much as possible, reference to local details which would be unintelligible, or uninteresting, to the general reader. Lest, however, this question should hereafter be mooted again, it will be desirable to place on permanent record the data on which I based my conclusions.

I fixed my datum-line at a point 9ft. below the top edge of the pile sheeting of the "starling" of the pier on the Monmouthshire (or South) side of the centre arch of the Road Bridge, under the centre line of the bridge. I once (and only once) saw the water down to the level of that point, leaving only three feet of water in the deepest part of the channel under the bridge, where it is naturally washed out by the scour deeper than elsewhere. This was so exceptional an occurrence that I am not surprised that Mr. F. W. Dibbin (the engineer referred to in my letter) fixed his average low water 1.29ft. above my datum; and Mr. Hughes (mentioned in Mr. Barry's letter) fixed it 3ft. above my datum.

Starting from this datum-line the following are the measurements of the important points, taken partly from Mr. Dibbin's record ; partly from Mr. Hughes' scaled drawings ; and partly from the Ordnance Survey. I have tested them in every possible way, and can find no discrepancy between the various measurements.

| | Feet above
datum line |
|--|--------------------------|
| Datum-line 3ft. above deepest point of river bed, and 9ft. below edge of starling) | 0'00 |
| Dibbin's average low water | 1'29 |
| Hughes' do. do. | 3'00 |
| Edge of starling under centre line of bridge, south side of centre arch | 9'00 |
| Top of piers of bridge (23'45ft. from Ordnance datum) | 42'00 |
| Doorstep and kitchen floor of Bridge Inn | 46'71 |
| Doorstep of shop at corner of Bridge Street and St. Ann's Lane | 48'13 |
| Tide of January, 1846 | 48'39 |
| Tide of October, 1883—also the level of under-side of spans of land arches (30ft. above Ordnance datum)..... | 48'55 |
| Tide of 1799 | 49'13 |
| Crown of intermediate arches (under-side of spans)..... | 53'00 |
| Crown of centre arch (do. do.)..... | 56'00 |

It thus remains that the highest tide of which we have any authentic record was 49'13ft. above the lowest point of ebb that I ever saw, 47'34ft. above Mr. Dibbin's low water line, and 46'13ft. above Mr. Hughes' low water line. If anyone should hereafter see the water lower than my datum, or more than 7ft. 1½in above the piers, he will "please note."

At the same time it must be remembered that the true measure of the range of a tide is the difference between the levels of high and low water of that particular tide, so that probably no tide has achieved a range equal to the above figures. This is the more probable because exceptional tides seem to have been concurrent with land floods. In January, 1768, when the big tide referred to below occurred, there were great floods at Hereford, Ross, and Wilton. In January, 1846, there were great floods in the upper Wye and the Lugg, "none such since 1795, when Hay Bridge was washed away ;" and the tide of 17th October, 1883, occurred after a very wet September, and a few days after some exceptional rains in the Wye Valley. The ebb on such occasions would not go down to within 7 feet of my datum.

It would be interesting if the original error could be run to earth. It probably began with the tide of 1768, to which Lyell referred, as quoted by Mr. Moore. Cliffe's "South Wales" (1848) says : "The tide (at Chepstow) rose in January, 1768, to an altitude of 70 feet to the injury of the old wooden bridge." Lyell, in "Principles of Geology," Vol. 2, p. 26 (1840) says : "At Chepstow [the tides] reach 50 and sometimes 69 and even 72 feet," and gives as his authority Captain Beaufort R.N. ; and Norie's "Epitome of Navigation" (1835) gives 70 feet as the average height.

These "authorities" must have proceeded upon one common source, without an attempt at verification. A tide of 70 feet would have covered the old bridge by about 20 feet, as will be readily seen from old engravings of it ; and would have wrecked all the shipbuilding yards and warehouses which made the town then a place of importance, and swamped half of the then town also ; but there is no record of such a catastrophe. The damage to the bridge was probably caused more by the flood above mentioned than by the tide.

It occurs to me that probably on that occasion a survey was made, and the surveyor measured the tide as 72 *links*, equal to just 47 feet 6 inches, or very nearly what we now know to be the maximum range. This measurement may have been afterwards spoken of as 72 *feet*, and hence the mischief began, and went on till the railway engineers took the matter in hand.

To prevent any misapprehension hereafter, I would point out that Mr. Barry's inference, that the tide of 1883 covered the iron palisading of the bridge, was based on the assumption of the accuracy of the figures which have now been disproved. The tide, as a fact, was much below the top of the palisading at its lowest point.

I said in my letter that "tidal waves" were due to causes other than those which produce tides. I had in my mind the tidal waves in the Dart to which Mr. Moore has referred. Some notes on these from information obtained by me at Totnes at the time will be found in the "Meteorological Magazine," Vol. 27, p. 115.

2.—VARIATIONS OF ABSOLUTE LEVEL OF HIGH WATER AT DIFFERENT POINTS.

It will be well worth while to institute a series of observations, at points along the estuary of Severn and its tributaries, of the relative heights of maximum tides referred to Ordnance datum. At present I can only offer the following:—

Mr. Worsley-Benison has set out a copy of the brass in Goldcliff Church. The flood there mentioned was no doubt due to tide and not to land water, for the tide on the evening of 20th January, 1606 (O.S.) will be found (making due allowance for change of style, &c.), to have been the fifth after the full moon; which would make it "the top of the springs."

The brass is 24 feet above Ordnance datum, or 9 inches only above the piers of Chepstow Bridge. Assuming, therefore, that the tide of 1606 was no less than the tide of 1799 (and it was possibly greater), we have a difference of at least 6ft. 4½in. in a short shore of about 16 miles.

I have it also on the authority of Mr. Dibbin, that all exceptional tides were marked on a brass plate in the kitchen of the Dog Inn, at Over, near Gloucester. If that is still extant, and its relation to Ordnance datum be ascertained, very useful information may be gained.

Such comparisons may teach us a good deal as to the effect on tides of the contours of shore lines, and may lead also to other considerations. Geologists have noticed on the shores of estuaries, and notably in the Gulf of St. Lawrence, ancient "raised beaches," the level of which gradually inclines upward towards the sea; and have explained the fact on the hypothesis that the elevation, which left the beach high and dry, has been more marked at the mouth than at the head of the estuary. It may be that the true explanation is to be found in some such variation of tide level (under the then conditions of the estuary) as I have shown to exist now between Goldcliff and Chepstow.

From a report of Mr. Bunt, the observer of the Tide Gauge at Bristol, quoted in Cliffe's "South Wales," it appears that the level of high water at the Hotwells is one foot above that at King Road. He also notes that the tide of 29th January, 1846, was the highest registered by him, its height being 38ft. 8in. above the sill of Cumberland Basin.

3.—THE BORE IN SEVERN.

I have nothing to add to Mr. Moore's description, or Mr. Miller's explanation, of the phenomenon.

Locally it is called the "higre," or "hygre"; and this has been fancifully derived from "eau-guerre." It is really a corruption of "eagre," the English

equivalent of the Scandinavian "Bore." It is derived from the A.S. *égor*=sea or water. Professor Skeat quotes from Dryden, "But like an eagle road in triumph o'er the tide."

Just below Sharpness lies the "Sanager" sand. This is probably a corruption of *san* (imp. of *sinnau* A.S.)=*be mindful of*, and *égor*=*the flood*. The spot would naturally be that where the cry "Flood, oh!" or its Saxon equivalent, arose on such an occasion.

4.—THE BORE IN THE WYE.

I am glad to be able to add a note on this, as it seems to be generally unknown. I have found even fishermen and boatmen entirely ignorant of it.

It commences a little more than half a mile above the Chepstow Road Bridge, at a point a few yards above the old Roman Crossing beneath the Alcove in the Piercefield Woods. Its course extends upwards for just a mile, through the straight reach called "Longhope" reach, or "The Hope."

About 250 yards above Chepstow Bridge the river takes a very sharp bend (the second half of an "S" curve) northward under the Castle. At low water the channel is immediately under the Castle rock, on the Monmouthshire (or concave) side. On the Gloucestershire (or convex) side the bank of alluvial clay slopes somewhat steeply; but at low water there stretches out from it an extensive "spit" of firmer ground, forming a flattened beach, which very much narrows in the channel, and in no part rises to any considerable height above low water mark.

Except a few stones opposite the Bridge Quarry, and the starlings of the bridge, this spit is the first serious obstacle which the flood tide meets after it enters the Wye.

The similarity of this spit to the "Noose" in Severn, mentioned in Mr. Moore's paper, is very remarkable, only it is on a smaller scale, and the direction of the bend is reversed.

Above the spit, to the place where the Bore forms, the banks are somewhat steep, that on the Monmouthshire side being rocky. Soon after passing the Roman Crossing the river bed presents a narrower section at low water level, with the banks at lower angles.

The phenomenon may be best observed from the summit of the Penmoyle Cliffs, which command the whole of "The Hope." The time to observe is at the making of the flood on the fifth tide after new or full moon; and preferably at the St. David's tide in the beginning of March, or at the latter end of September.

If, however, much fresh water is coming down, so that the "spit" is not laid bare, there will be no bore.

The explanation is similar to that given of the Severn Bore. The flood tide, rushing up through the bridge, is backed and ponded up by the spit, just as the Severn tide is by the Noose. At length the spit is covered; possibly some of its top layer also gives way; the body of water rushes on, and, at the narrowing in again of the channel, mounts up and spreads out at the same time over the flattened banks. It advances up "The Hope" with a head of about 2ft., and a roar plainly heard on the cliffs above. As it passes, the ebb, which immediately before was making down, is turned back, and the flood is seen to be strongly making up.

I never saw it pass round the bend at the north end of "The Hope;" but it dies out opposite the upper Llancaut Quarry, where a "weir" shows at low water.

5.—THE INTERMITTING WELLS AT CHEPSTOW.

Within a few yards to the north of the well mentioned in Mr. Moore's paper is another well sunk in the cellar of Gwy House, in Bridge Street. Of the action of the

former well I know nothing. The latter I know very well, having been a frequent visitor at the house.

I could never satisfy myself that the water actually receded from this well on the rising of the tide. But this is certain, that at high water the well could readily be pumped dry; and no more water would come in until the tide went down. It is possible that on such occasions the Gwy House pump may have drained the neighbouring well, and so have given rise to the belief that the water receded.

I have on several occasions (perhaps four or five) known the water to rise up in the well and flood the cellar to a depth of about 18in., which (speaking from memory here) would be about one foot below the 1883 level. This would happen after very heavy rainfall, accompanied by an exceptional tide.

The well is 400ft. from the river bank; but on no occasion, and under no circumstances, is the water brackish. It is strongly impregnated with lime salts.

On reference to Sheet 35 of the Geological Survey a fault (which for distinction I call the main fault) will be seen starting a little south-east of the bridge, and going north for one and three quarter miles, cutting the river bed at four points.

The wells in question are sunk either on or very slightly to the westward of this main fault.

I doubt if the whole length of the fault is shown on the Survey. I think it probably extends to, and is cut off by, a cross fault visible (but overlaid by "dolomitic conglomerate") in the quarry at the Railway Station; and is also cut off, at the north end, by another cross fault (not shown on the Survey) starting 100 yards south-west of the Cockshut, crossing the river, and passing a little south of the Liveoaks Farm.

On the west of the main fault the dip is eastward, or against the fault. About half-a-mile north of the bridge, in Chapel House Grove, is a considerable area of Farewell Rock (not shown on the Survey), pitching east 33° against the fault. This indicates by comparison with Tidenham's Chase a down-throw west of 460ft.

The conditions are, therefore, favourable for the inclusion between these faults of a large body of water, entering at the outcrops of carboniferous limestone to the west of the Wye Valley, and of the area of Farewell Rock just mentioned.

The explanation I have to offer is, that the wells are fed by the fault, and that the water, under certain conditions (that is, when unaffected by heavy rainfall), comes under the river along the fault; and that, under the pressure of a tide with a vertical head of 40ft., the passage along the fault (which has a considerable dip) closes, and the passage of water is prevented until the pressure is relieved by the tide going down.

Under an unusual condition of level, underground water may find its way by other fissures to the well; and under these conditions the tide pressure may prevent the water passing away to lower strata, and so co-operate towards the filling up of the well. This would require that in this case the water would not pass under the river, but come from sources southward of the castle, while in ordinary times it came from the north. That this is not improbable is evidenced by the fact that in rainy seasons a considerable quantity of fresh water issues from the Castle rock, from a point higher than the wells, through a fissure which at other times either is quite dry or sends a small trickle.

I admit that there are difficulties in this solution; but the purity of the water excludes any theory of infiltration. The difficulty is to account for two apparently inconsistent phenomena.

I do not for a moment question Mr. Moore's explanation of the action of the Perim well; and I may mention, as having some bearing on the question, that Mr.

Dibbin informed me that in sinking the columns of the railway bridge through the river bed a stratum of running sand was intersected with a stream of clear pure water. Whether or not this is an element in the case, and whether (if so) it points to Mr. Moore's solution or mine, is a matter for further enquiry. J. G. W.

ADDENDUM.

Readily rejecting, in this case, the theory of infiltration, I have no hesitation in adopting the explanation given by Mr. James G. Wood, based as it is upon known geological conditions, which, I hope, will be further explored.

With reference to Perim island, the formation is basaltic. The rock is similar, in texture and colour, to our Dhu stone from the Titterstone Clee Hills, and the elevations, the highest only 213ft., are covered with enormous boulders, as if ejected from a volcano. The distance from the coast of Arabia is a mile and a half. The lower grounds in the bays and the bed of the harbour are coral.

I was far too busy with other important works to devote more attention to the very shallow wells, sunk only from a few inches to one foot in depth, and I left the island shortly after the discovery of the shallow basin of fresh water intermitting *inversely* with the tide.

H. C. MOORE.

THE TIDAL WAVE IN THE WYE AND SEVERN.

DEAR SIR,—Please accept my thanks for your kindness in giving me the opportunity of an early perusal of the paper on "The Tidal Wave of the Wye and Severn," contributed to the Society by Mr. H. C. Moore. As an independent testimony to the height of the abnormal tide of 50ft. in the river Wye at Chepstow it is a valuable contribution and very interesting, but does not, I think, reveal anything particularly new as to the height of that particular tide, or the general run of the tide at Chepstow, the mean spring range of the place having been long established as 38ft., with a rise of 28ft. 6in. at neaps. I write abnormal tide advisedly, as I have always understood that the said 50ft. represented the height of the highest known tide in that locality, as the 70ft. given for the Bay of Fundy does for some place in that bay, the identity of which I have never been able properly to locate. I have often heard it stated that the tide at Chepstow represented the highest rise of tide in our islands, and that it was also the second highest known rise in the world, but it is well known to those conversant with tidal investigations that neither statement is strictly true. As a matter of fact Chepstow must be relegated to a third, if not a fourth, place in the tidal system of the British Isles, and certainly to a fourth place in the tides of the known world, as you will see by the list of known or established spring ranges, a copy of some of which I append. They are taken from our Admiralty publications on the tides, and those of the United States Coast and Geodetic Surveys.

It is perhaps necessary in connection with them to explain that in determining the value known as the mean spring range it is usual to take the mean of the heights of all the spring tides throughout a year or more—some 25 to 27 in number. These tides, the highest of the series called spring, occurring at the time of the new and full moon, vary in height between the highest and the lowest springs by a few feet, the highest obtaining at or near the time of the equinox in March and September, the lowest in June and December. You will note that the mean spring does not give the height of the highest spring tide of the year, but when I add that the highest possible range of the tide in the Bristol Channel can nowhere exceed the mean range under the most favourable circumstances more than 4ft. 6in, you will be able to judge what

the height of the highest tide, other than an abnormal one, will be, and anything over and above such height will have to be accounted for by other influences than those governing the wave of the tide as it makes high water. It is also worthy of note that the great heights of 38ft. and 40ft. do not obtain all over the Bristol Channel, for at the entrance to the Channel, at Padstow on the south, Milford (St. Ann's Lighthouse) to the north, and Lundy Island central, the ranges are 22ft., 24ft., and 27ft. respectively, with a gradual rise in amplitude, as the wave proceeding to the eastward culminates in Ring Road with a height of 40ft., against 38ft. at Chepstow.

In the Bay of Fundy—which might more properly be termed a gulf, and which extends inwards in a north-easterly direction into the eastern seaboard of the United States and Dominion of Canada some 200 miles, varying in width from 150 miles at the entrance to 30 miles at the top, when it is divided by a narrow peninsula into two forks or branches, the one going northward named the Bay of Chignecto, the other to the eastward, the Basin of Mines—the same rule obtains. It is in these forks, or branches, that the abnormally high tides supposed to be the highest in the world take place. A notable feature in the tides of the Bay of Fundy is the small difference there is between the mean spring and neap ranges, it only amounting to from 4ft. to 8ft., as compared with from 10ft. to 15ft. in other parts of the world.

At the town of Sackville, situated at the head of the north fork of the great bay, the mean range of the tide is 39ft. 6in., and the mean spring range 45ft. 3in. On the point of the peninsula is situated the town of Chignecto, and a little eastward of it, and immediately at the entrance to the Basin of Mines, on the River Parr, stands the town of Parrsboro'; here the mean range of tide is 37ft. 6in., and the mean spring range 43ft. 9in. At Noel Bay, at the top of the basin, the mean range of tide is 43ft. 9in., the mean spring range 50ft. 6in., and the neaps 43ft. 6in., whilst at Windsor situated at the confluence of the rivers Avon and St. Croix, and within the basin, the spring range is 48ft. and the neaps 40ft.

At Yarmouth, on the eastern side of the entrance to the Bay of Fundy, the range of tide is 13ft., whilst at Mount Desert Island, on the opposite side of the bay, it is only some 10ft. or 11ft. At St. John, situated about half-way up the bay, on the west side, the mean range is 23ft. From the foregoing it will be seen that to speak or write of the tides of the Bay of Fundy as ranging 70ft. is an error, that it is only at the top of the bay that the great heights are reached by the wave, and that even there they do not by any means equal the 70ft. quoted by the writer, as put forward in Dr. Morrison's "Historical School Geography" (1888).

Eli Sowerbutts, Esq., F.R.G.S.,

W. NELSON GREENWOOD.

Secretary Manchester Geographical Society.

TIDE HEIGHTS APPENDED—HIGHEST KNOWN SPRING AND NEAP RANGES.

| BAY OF FUNDY. | | |
|------------------------|------------|------------|
| Place. | Springs. | Neaps. |
| Noel Bay | 50ft. 6in. | 43ft. 6in. |
| Horton Bluff | 48ft. — | 40ft. — |
| Spencer Anchorage..... | 39ft. — | 33ft. — |
| Black Bank Bay | 36ft. — | 31ft. — |
| Haute Isle | 33ft. — | 28ft. 6in. |
| George Point | 32ft. — | 28ft. — |

PATAGONIA.

| | | |
|-----------------------------|---------|---------|
| Gallegos Point, E.C. | 46ft. — | — — |
| Coy Inlet | 40ft. — | — — |
| Santa Cruz River, E.C. | 40ft. — | 29ft. — |

MAGELLAN STRAITS.

| Place. | Springs. | Neaps. |
|----------------------|------------|---------|
| Direction Hill | 38ft. — | 23ft. — |
| Dungeness | 44-36ft. — | 30ft. — |
| Espiritu Santo..... | 42-36ft. — | — — |
| First Narrows | 42-36ft. — | — — |
| Possession Bay..... | 42-36ft. — | — — |
| Sarmiento Bank | 42-36ft. — | — — |
| Cape Virgins | 42-36ft. — | — — |

ENGLAND.

| | | |
|---------------------------------|------------|------------|
| King Road | 40ft. — | 31ft. — |
| Walton Bay..... | 39ft. 9in. | 30ft. — |
| Chepstow | 38ft. — | 28ft. 6in. |
| Newport | 38ft. — | 29ft. — |
| Cardiff | 37ft. 6in. | 29ft. — |
| Weston-super-Mare..... | 37ft. — | 28ft. 6in. |
| Bristol, Cumberland Basin | 31ft. 6in. | — — |
| Bridgewater Bar | 35ft. — | 26ft. 6in. |

FRANCE.

| | | |
|------------------------------|------------|------------|
| Granville | 37ft. — | 27ft. 6in. |
| Cancale..... | 37ft. — | 27ft. — |
| St. Malo | 36ft. 3in. | 25ft. 9in. |
| Chausey Isle de France | 35ft. — | 26ft. — |
| Minquiers Rocks..... | 35ft. — | 26ft. — |
| Erque | 33ft. 3in. | 24ft. 6in. |

AUSTRALIA.

| | | |
|--------------------------|---------|-----|
| Collier Bay, N.W. | 36ft. — | — — |
| Usborne Point West | 34ft. — | — — |
| Camden, N.W. | 30ft. — | — — |

CHINA AND KOREA.

| | | |
|-------------------------|------------|-----|
| Hankan..... | 50-38ft. — | — — |
| Kin Kiang | 40-24ft. — | — — |
| Lundy, W.C. Korea | 30ft. — | — — |

DAVIS' STRAITS.

| | | |
|--------------------------------|-------------|-----|
| Frobisher Bay, N. W. Arm | 45ft. (?) — | — — |
|--------------------------------|-------------|-----|

HUDSON'S STRAITS.

| | | |
|------------------|---------|---------|
| Ashe Inlet | 30ft. — | 22ft. — |
|------------------|---------|---------|

CALIFORNIA.

| | | |
|-------------------------------|------------|------------|
| Colorado River Entrance | 30-25ft. — | 20-16ft. — |
|-------------------------------|------------|------------|

April 2nd, 1894.

W. NELSON GREENWOOD.

COLLEGIATE SCIENCE DEMONSTRATIONS.

Communicated by the Rev. J. Corbishley, Ushaw.

[Read to the Society, in the Library, April 18th, 1894.]

A new departure at Ushaw College is so interesting that the proposals for 1892 given below will be found of interest. The subject given for 1893 was Nansen and the North Pole, and resulted in a most interesting paper.

ST. CUTHBERT'S COLLEGE, USHAW.

SCIENCE DEMONSTRATIONS.

July 26th, 1892.

A new departure in the whole method and scope of what were "Defensions in Natural Philosophy" is being made this year at this College, which seems to call for explanation, if not for an apology. The plan to be adopted at what may now be called "Science Demonstrations" in place of "Defensions in Natural Philosophy" is to read papers on subjects which deal with, comparatively speaking, recent discoveries, or with subjects which, though not new in themselves, have a special importance about them from their local interest.

After each paper a discussion is invited, which the reader of the paper will close by answering difficulties raised and furnishing the information required.

The first advantage of this method is to make the students masters of some one scientific question, and, if possible, of one in which they have a natural interest. By uniting an accurate treatment of the branch of Science with which a given paper is connected and the more profound study of special points, something may be done to meet the danger, which is felt in Physical Science above all others, of imparting a *merely superficial knowledge* in the effort to run abreast of the great advance which is going on all along the line of the Physical Sciences.

The desire for something like the new method has shown itself in the past, where persons who "objected" to propositions have impatiently hurried over the proposition itself—in many cases one established as a scientific fact for centuries—and have desired to draw the defender on to some recent aspect or development of the question, to which his attention could not have been specially directed when he had so much ground to cover. It will be the very object of the present arrangement to meet wants of this kind on the part of those who are most to be considered, because they are personally interested in the subject.

But there is a wider aspect, and one which reaches further, in the new departure. It is that it may serve to stimulate original research, not in any abstruse but in simple and useful matters, which in many cases the author of the paper will be able to get well in touch with himself by handling things and not merely reading of them in books. For example, special interest would attach to making a complete collection of fossils for the County of Durham, which in its coal measures and limestone beds furnishes a very good field for work: it is hoped that this may be taken in hand and

form in some way the subject of a future paper. As another simple example, the whole question of the formation of dew, which was supposed to have been threshed out a century ago, but which has had a completely new complexion put upon it during the last ten years, can be handled completely with a few thermometers to aid careful observation. Again, the life history of some of the lowest forms of animal life studied under the microscope supplies a readily workable subject. All subjects of research receive a point, and may be expected to inspire a motive for work, when there is a market in which to expose the results obtained. Special points for investigation might be suggested from without, and help given to carry out the work.

The papers whose titles are given below are connected, one with Meteorology, one with Heat, and one with Geology. The first paper, on predicting storms which cross the Atlantic, is an illustration of the modern way of looking at the determining causes of Weather; and, though the prophetic value of the work done is not great, the results are remarkable as evidence of the information which can be got at by lavish observation. For some of the materials supplied to the author of this paper I have to thank R. H. Scott, Esq., M.A., F.R.S., Director of the Meteorological Office, who has kindly furnished information which could not be obtained except from him. In preparing the paper and diagrams for the Westinghouse Brake, the Locomotive Superintendent of the North-Eastern Railway at Gateshead has afforded facilities for the inspection of their brakes, and has kindly lent the working parts of the brake, which can only be well understood by close examination and thorough handling. The last paper is on Geology, the study of which has been introduced into the course for the first time this year in connexion with Dr. Klein's Lectures on Biology. For the purposes of this paper, the Professor of Geology in the Durham College of Science in Newcastle-upon-Tyne, Professor Lebour, M.A., author of the "Handbook of Geology for Northumberland and Durham," has furnished various books and maps, and has very kindly lent a selected set of fossils from the collection at the College of Science to illustrate a few of the more striking Flora and Fauna of the time of the coal measures, and to supplement the fossils of that period in our own Museum.

It is hoped that this first attempt—determined on very late in the year—may form a small beginning towards some true scientific work, which will be a source of real improvement to those engaged in it, making them in some sense specialists in an age when an ordinary man must be a specialist to be anything, and that it will be a gratification to the friends of the College.

The Oxford Geographical Studentship, 1894.—The electors appointed by the Royal Geographical Society and the University of Oxford have elected to the annual geographical studentship, instituted jointly by the two bodies, Mr. Charles Raymond Beazley, M.A., of Merton College, Oxford. Mr. Beazley has given special attention to the exploration of the African coast by the Portuguese, initiated by Prince Henry the Navigator, and, with the approval of the Council, he will probably endeavour to carry out investigations on either the east or the west coast of Africa, with a view to throwing further light on the narratives of Portuguese enterprise.—*Proceedings of the Royal Geographical Society, April, 1894.*

Origin of the name Vienna.—The origin of the word Vienna, in German *Wien*, has of late given rise to much discussion. Müllenhoff and Miklosich tried to prove that the names *Vindobona*, *Vindomana*, and *Vidobomina* are the original Celtic forms, and that the word *Veduni*, of Slav or German origin, is an intermediate link. But Dr. T. R. von Grienberger has recently shown (*Mitth. Geogr. Ges. Wien*, 1893, vol. xxxvi., p. 657) that this is impossible, inasmuch as *Vindobona* and *Veduni*, or *Wedonb*, have no connection with each other. He regards the Celtic *Vindobona* as a composite name—a view which we find supported by Professor Egli in his great work, "*Nomina Geographica*," he being inclined to regard the word *Wien* as coming from the composite Celtic place-name *Vindobona* = White Castle (*vindos* = white, *obna* = castle).—*Proceedings of the Royal Geographical Society, April, 1894.*

BOOKS AND ATLASES.

THE STORY OF THE LONDON MISSIONARY SOCIETY, 1795—1895. By C. SILVESTER HORNE, M.A. With maps and illustrations. *London: London Missionary Society*, 1894. Price 2s. 6d.

THIS centenary volume cannot fail to be attractive from its subject. It would have been an easier book to read and remember if the story of each group of Missions had been given continuously, but that was not the plan of the author.

The numerous portraits of famous missionary travellers—Captain Wilson, Rev. J. Williams, Dr. Vanderkemp, Rev. Robert Moffat, Mrs. Mary Moffat, Rev. Robert Morrison, Rev. James Gilmour, and a number of others—the pictures of the successive missionary ships and of foreign scenes all lend themselves to a pleasant reminder of those who have gone, but “who have made their lives sublime.”

The maps are not worthy of the book, and should either have been better done or omitted. At least all the places mentioned in the text should be shown on the maps, and as they are but diagrams, that should have been an easy thing to do. There are a few errors which will no doubt be corrected in another edition.

The book will become a favourite reading book, and some of the stories, as those of Horne, Gilmour, Williams, Vanderkemp, Moffats, and Livingstone, are very fascinating.

THE CASTLE LINE ATLAS OF SOUTH AFRICA. A series of sixteen plates, printed in colour, containing thirty maps and diagrams. With an account of the geographical features, the climate, the mineral and other resources, and the history of South Africa, and an index of over 6,000 names. *London: Donald Currie and Co., 1—4, Fenchurch Street, E.C.*, 1895. Price 3s. 6d.

THIS little handbook is of great value to anyone taking an interest in South Africa and its affairs. The historical summary gives a fairly complete but concise view of the historical evolution of the country, of the various peoples, of the topography, and of the natural wealth of the country.

The maps are clearly printed, on a fairly large scale, and the book is a valuable addition to the bibliography of South Africa.

TARAVATU MATAMATA JESU KERISO ENA, ita eda Lohiabada bunai ita ihamaurida. Motu gadodio e hahegeregere. *London: British and Foreign Bible Society, 1891. Price 1s. 8d.*

THIS is a copy of the Motu New Testament, and is now being largely used at the South-East part of New Guinea. The book illustrates the great debt science and geography owe to the labours of missionaries of every creed and in all parts of the world.

The language has to be taken down and put into shape, and the translations are made—some of them imperfect at first, but gradually made complete, and these literary works then help to fix the language and become a standard of reference.

This book is in all points an example of these processes.

A TIMBOUCTOU. Par P. VUILLOT, Membre de la Société de Géographie. 8pp. illustrated. Extrait du "Magasin Pittoresque," 1894.

M. VUILLOT has published a large book, a study of the exploration of the Sahara; from the historical and geographical point of view this small reprint is of some interest, and the pictures are interesting. The presence and strength of Mohammedanism in Timbuctoo are made very manifest, and we do not wonder, after seeing the pictures of the mosques, at the closing words, "les marabouts, saluant le jour nouveau, appelleront le peuple à la prière! Allah Akbar! La illah illallah! Mah-madou rassoul Allah!"

A FEW DAYS IN THE LIFE OF A ROYAL NAVAL CADET ON BOARD H.M.S. "BRITANNIA." By NAVILUS. 60pp., paper covers. *London: G. Philip and Son. Price 1s.*

A HEALTHY, hearty description of a Naval Cadet, showing his daily life on board ship, and the total lack of coddling of the young people.

It is a book a small boy will enjoy; is soon read; and as it is by "one of the babies," it is equally of interest to the older people.

THE ABORIGINES OF WESTERN AUSTRALIA. By ALBERT F. CALVERT. 56pp. *London: Simpkin, Marshall and Co., 1894.*

THIS is a small book, written partly from personal observation by the Editor of the "West Australian Review." It is written in a racy style, and is very interesting as a help to the knowledge of the folk-lore, music (with notes), and the manners and customs of these people.

To quote from the book would almost mean copying it all out. It is in the Library and will well repay perusal.

The notes on the boomerang, on the degradation of women, on marriage and burial, and the remarks on the subject of native protection by the Colonial Govern-

ment, are interesting and somewhat painful reading. This little book raises in its few pages a good many great problems in human life and history, but leaves its readers to solve them as best they may.

HOW TO LIVE IN TROPICAL AFRICA: A GUIDE TO TROPICAL HYGIENE.
The Malaria Problem: the Cause, Prevention, and Cure of Malarial Fevers. By J. MURRAY, M.D. Illustrations and maps. 252pp.
London: G. Philip and Son. Price 5s.

THIS is a useful book, and contains some valuable hints, not only to dwellers in the Tropics, but to those who stay at home. The chapters on Domestic Sanitation are very good, and the remarks on the proper construction of the house and the arrangement of its surroundings may be read with reference to temperate as well as tropical surroundings. The guidance given as to personal conduct, and the need of absolute cleanliness in daily life, and in reference to water used for drinking, and other matters of a like kind, will be of great advantage to those who are prepared to profit by the advice given.

PHILIP'S SYSTEMATIC ATLAS, PHYSICAL AND POLITICAL, specially designed for the Use of Higher Schools and Private Students; containing over 250 maps and diagrams, in 52 plates, with an Introduction and Index of 12,000 names. By E. G. RAVENSTEIN, F.R.G.S. 4to. *London: George Philip and Son, 1894.* Price 15s.

THE intentions of the publishers of this atlas are set forth in a preface, signed by Messrs. Scott Keltie, Mackinder, and Ravenstein, and a few extracts from the preface will make them clear:—

"This atlas is intended to meet the requirements of pupils in higher schools, of teachers, and of other students of geography, for whom neither the ordinary school atlas nor the general reference atlas is entirely adequate. . . .

By the title which we have given to it we claim that, unlike many 'new' atlases, this is not an indiscriminate collection of maps and fragments of maps which have for years done duty in other atlases, but that it has been built up on a carefully considered system, and that every map has been specially constructed to take its place in the general plan. . . .

"In planning the atlas, care has been taken to give due prominence to those countries and regions specially interesting to British students.

"Thus ten plates are devoted to the British Islands, whilst the British Colonies and "spheres of influence" are shown on a larger scale than is usually employed in an atlas of this kind.

"In order to enable a comparison to be made of the areas of different countries, we have largely employed equivalent projections, and have also drawn as many maps as possible on the same scale, or in multiples and sub-multiples of that scale.

"Thus, on a scale of 1 : 500,000 (8 miles to an inch) are given 27 regions of special interest.

"On double this scale, 18 maps.

"On 1 : 1,500,000 (25 miles to the inch), Great Britain, the Channel Islands, Switzerland, and Palestine.

"On 1 : 5,000,000 (80 miles to the inch), the British Islands, and all the other countries of Europe, except Russia.

"On 1 : 10,000,000 (160 miles to an inch), the British Isles, Central Europe, South-East Australia, New Zealand, and Canada.

"On 1 : 15,000,000 (250 miles to the inch), South-Eastern Asia, India, Russia, Scandinavia, and nearly every other country of Europe.

"On 1 : 20,000,000 (314 miles to the inch), Europe, Australia, New South Wales, Mexico, and the West Indies.

"On 1 : 40,000,000 (628 miles to the inch), the great continents.

"Great care has been exercised in the selection of names.

"For certain purposes, there is no doubt that the fewer names there are on a map the better.

"The omission of many of the names in this atlas would have improved the appearance of the maps, and would have rendered them more graphic.

"We have had, however, to consider practical purposes, and an atlas with a scanty supply of names would hardly have met the requirements of teachers and students. . . .

"Due attention has been paid to the practical or human aspects of geography, and especially to commercial geography.

"The principal railways are indicated on all the political maps, and a map of the world has been more especially designed to show the commercial highways by land and by sea.

"There are maps of every country, showing density of population and distribution of languages.

"There are also special maps, showing the distribution of plants and animals, and in the construction of these particular attention has been paid to such products as are useful to man, and enter largely into commerce. . . .

"The general idea which has governed its compilation has been the provision of a body of matter, so ordered that teachers may easily demonstrate those contrasts and comparisons which make of geography, as it is now generally recognised, a study of high disciplinary value."

The atlas is very carefully prepared, and the maps are beautifully printed.

The extracts from the preface sufficiently describe the intent and purposes of its preparation, and the Council of this Society marked its appreciation of its value by selecting this atlas for a first prize in the recent Examination in Geography.

It is a very creditable work by an English publisher, and marks a distinct departure from the mere diagrams crammed with names, which have so long been the despair of the geographer in English atlases.

It is perhaps a pity—but in an atlas of this size and cost could not be helped—that the maps of all the principal countries are not on the same scale.

It is difficult to make the mental comparison between the size of England and Russia; large areas should have large maps. It could not have been done at the moderate cost at which this atlas is published, but it is well to keep the idea in mind.

The remarks on map projections are good as far as they go, but should have been more complete.

The atlas, notwithstanding a few small things which we hope will be improved in future issues, will be a treasure to earnest students and to teachers.

The flat form of the atlas is the best for use, and is not too large for ready reference.

TEN YEARS' CAPTIVITY IN THE MAHDI'S CAMP, 1882—1892. From the Original Manuscripts of Father Joseph Ohrwalder, late priest of the Austrian Mission Station at Delen in Kordofan. By Major F. R. WINGATE, R.A., Director of Military Intelligence, Egyptian Army, &c. With maps and illustrations by WALTER C. HORSLEY. Revised and abridged edition. 472pp. London: Sampson Low, Marston, and Company. Price 3s 6d.

THIS is a most interesting report by Father Ohrwalder of the Mahdi, and of the events in Central Africa to the fall of Khartoum and the death of the Mahdi.

Major Wingate must have enjoyed drawing out the narrative of the escape of Father Bonomi and of Father Ohrwalder, as we understand it was mainly by his clever arrangements that these escapes from Omdurman were made possible.

There are few novels written with more exciting incidents, and it is difficult to lay the book down after beginning its perusal.

The book is well illustrated and is printed with large type, and the price places it within reach of a large number of readers.

It is a fascinating book, and we are not surprised to find that the original compilation has gone through nine editions already, this copy being one of the tenth edition.

All the illustrations and maps are retained in this edition.

Gold Mining in British Guiana.—The proportions which this industry is assuming may be judged from the following figures, which have been supplied by the officer in charge of the district: In 1892 131,425 ounces of gold were exported, and the output for 1893 was 142,000 ounces. All the gold, so far, has been obtained by alluvial washing, but mining has now been started on quartz reefs in the North-west District, on the Barima, and also on the Demerara rivers. About half of the output for 1893 was obtained from No. 2 District, which comprises the Potaro river, Conawaruk, and other tributaries of the Essequibo river, and gives employment to over 3,000 men. The Government has sanctioned a railway to connect the Demerara and Essequibo rivers, so as to avoid the rapids on the Essequibo, and make the journey from Georgetown to Potaro and Conawaruk a quicker and less dangerous one, and this work has already been commenced.—*Proceedings of the Royal Geographical Society, April, 1894.*

The Geography of Norway.—At the last meeting of the Norwegian Geographical Society, Dr. Hans Reusch, the well-known geologist, read an important paper on "A New Feature in the Geography of Norway." The sloping of the entire country towards the coast, said Dr. Reusch, does not continue right out to sea, but spreads outward along the low-lying, almost level part, for which he proposed the general name of "the strand-flat." Those who have visited Bergen will have noticed the lowland on which the town stands, and which surrounds it. The lowland flats of the Karm and Bömmel Islands will also be remembered by voyagers along the coast. All this forms part of the "strand-flat." This flat was, it must be assumed, formed in earlier geological times by the level of the sea being higher than at present. The corroding forces destroyed the land down to the "flat." This "strand-flat" is an uneven one, and, by its being partly washed by the sea, the enormously long Skjeer-gaard or chain of skerries along the coast has been formed. On the "strand-flat" are situated the towns of Stavanger, Bergen, Tromsø, &c., and hundreds of thousands dwell upon it. It must, therefore, be considered an important feature in the geography of Norway.—*Proceedings of the Royal Geographical Society, June, 1894.*

PROCEEDINGS OF THE SOCIETY.

JULY 1st TO SEPTEMBER 31st, 1894.

The 305th Meeting of the Society was held at the Hotel, Prestbury, on Saturday, July 7th, 1894, at 6 p.m. Mr. PHILIP WHYMAN, of Alderley, in the chair.



PRESTBURY CHURCH.

Mr. Whyman had arranged a driving excursion for the members from Macclesfield, chiefly through the country lanes and bye-roads.

From Macclesfield the party was driven to Gawsworth, through the beautiful avenue to the Church and Magpie Parsonage.

The church, with the Fitton Monument and "ye livelie effigie" of Shakspear's "dark ladie," the churchyard, with its curious and interesting tombstones and three left out of the at one time four very ancient elms, with the beautiful view of the church, the bordering fine trees, and the vicarage across the water of the miniature lake was much admired, and a good photograph of the view was obtained.

Gawsworth Old Hall was noted, the seat of the Earls of Harrington, and then the drive was resumed through a park-like country, with a great abundance of fine old timber, and the hedgerows decorated with a great wealth of wild roses, honeysuckle, and convolvulus, through Siddington, past the meres and park at Capesthorpe Monks Heath, and Birtles to Prestbury.

Just after passing the somewhat gloomy-looking pile of Birtles Hall, the party came to the charming little brick church of Birtles. The church will hold a congregation of about a hundred people. The whole of the walls were decorated by a former inhabitant of Birtles Hall. There is a large quantity of old carved furniture and woodwork within the church, and a very good organ. The organ was being played upon by a Manchester organist at the time of the visit.

There is an octagon tower of brick with a gallery on top, from which good views of the landscape may be obtained. The church and tower are both covered with ivy to the top of the walls and have a most unique and pleasing appearance.

There is a resident parson, but we did not see him about.



PRESTBURY HALL.

The church is not very old and was built as a chapel to Birtles Hall, but is now used as the chapel for Birtles and Over Alderley, and would probably hold all the up-grown inhabitants of those two parishes.

The drive was continued to Prestbury, where a good tea was enjoyed; and then the village, the church, and the Norman remains in the churchyard were duly visited.

The whole drive, lasting for about five hours, from Macclesfield was a great and surprising revelation of a beautiful district.

The drive was also much enjoyed from the fact that the party were favoured with careful drivers and good cattle.

Hearty thanks were given to Mr. Whyman for his care in making the arrangements, and for the satisfactory route he had chosen for the excursion, and a hope

was generally expressed that on a favourable opportunity Mr. Whyman would arrange another drive of equal interest.

A number of letters were read to the meeting.

The party returned home from Prestbury.

The 306th Meeting of the Society was held in the Tea Rooms near the landing stage of the Ship Canal, Lymm, on Saturday, July 21st, 1894, at 5 p.m. The SECRETARY in the chair.

A small party of members went and returned by a steamer to Lymm, along the Ship Canal, for the purpose of observing the progress of the works and the state of the banks.

An engineer accompanied the party.

The visit was very much enjoyed, and several incidents of the voyage were interesting.

The little steamer of the party seemed quite a dwarf in the locks, by the side of the swelling sides and great size of the steamers passing through at the same time.

A very pleasant afternoon was spent, and thanks were duly given to the guide.

The 307th Meeting of the Society was held in the Gardens of Barlow Moor Hall, on Saturday, July 28th, 1894, at 5 p.m. Mr. W. JOHNSON in the chair.

By the kind permission of Sir W. Cunliffe Brooks, Bart., a large party of members visited this famous old hall, passing on the way from Chorlton Station the Crematorium. A visit of great interest was made to it.

The keeper showed the building, the furnaces, and explained the methods; the cleanly, orderly, and pious way of dealing with the loved remains of the loved ones who have passed away was very much admired.

After a very full examination had been made, it was felt that this method must be the true solution of a large number of difficult questions relating to the final disposal of bodies, and nothing more decent could be devised. There was nothing to shock or disgust the most sensitive, such as is often found elsewhere, and from a sanitary point of view the arrangements appeared to be satisfactory.

Passing on from this place, through a pleasant field walk, the party arrived at the Hall.

Mrs. Fergusson, the housekeeper, gave the members a pleasant and courteous reception, and showed the building and its treasures, particularly calling attention to the collection of photographic studies made by Lady Brooks, who, the party was informed, is an admirable amateur photographer.

The party was then taken in charge by the gardener, who showed the park-like lawns, the gardens, and the greenhouses.

Several interesting photographs were taken; and very hearty thanks to Sir W. Cunliffe Brooks, to the housekeeper, and the guides, closed a very pleasant visit.

Letters were read from Professor W. Boyd Dawkins, Mr. C. H. Nevill, Miss A. M. Philips, Mr. A. McDowall, Surveyor-General of Queensland (enclosing a new and revised map of Queensland); Sir W. Cunliffe Brooks, Bart.; Mr. F. R. W. Howell, F.R.G.S.; Messrs. George Philip and Son, Sir George Taubman Goldie, Tyneside Geographical Society, Mr. Albert Nicholson (removed from Manchester).

The 308th Meeting was held on board a s.s. of the Manchester Passenger Syndicate, in the Ship Canal, on Saturday, August 18th, 1894, at 7-30 p.m. The SECRETARY in the chair.

This was a second excursion to Lymm and back by boat, which was very much enjoyed by the party.

Great interest was manifested in meeting the Pontoon Dock on its way to Manchester, and in watching the slow, sure, precise, and clever way in which the huge structure was passed through one of the large locks; and, in another case, by the curious way a large steamer just missed the large lock, and got herself very carefully across the Canal.

It seemed to be easy enough, but it took a long time to get her safely in the lock. It was a wonder to the landsmen that the pontoon should go right and the steamer go wrong. It all came right in the end; and the party was much interested in the manipulation of these structures, and very much amused at the volubility of the language of those directing the operations.

Very hearty thanks were given to the guide, and the party landed at Trafford Wharf long after "the shades of night had fallen."

The 309th Meeting of the Society was held in the Mechanics' Institution, Wellington Road, Stockport, on Wednesday, September 5th, 1894, at five o'clock p.m. The Rev. Canon SYMONDS in the chair.

This meeting was held on the invitation of Mr. T. H. Rathbone, the Hon. Local Secretary, to form a Local Committee at Stockport to further the work of the Society.

The members of the Society in Stockport and its neighbourhood were elected as the Committee, with Canon Symonds as Chairman, and Mr. T. H. Rathbone as Hon. Local Secretary and Hon. Local Treasurer.

It was proposed to endeavour to secure a room at Stockport, and to give a series of Victorian Lectures during the coming winter.

The Rev. S. A. Steinthal, Mr. J. Howard Reed, Mr. G. H. Warren, Mr. H. T. Crook, and the Secretary were selected as Lecturers.

The Secretary, on behalf of the Society, subscribed £2 2s. to a guarantee fund to cover the cost of the lectures, and the members present contributed sums sufficient to prevent loss.

It was arranged that tickets for half of the room should be sold, but that the rest of the seats should be free.

The details of the arrangements were left in the hands of the Local Committee.

Thanks to the Chairman and the Hon. Local Secretary closed a very profitable meeting.



THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY

CANADA.

By the RIGHT HON. THE EARL OF DERBY.

[Addressed to the Members of the Manchester Geographical Society, on Wednesday,
October 3rd, 1894.]

THE Earl of Derby, who on rising was received with loud cheers, said: My Lord Mayor, Ladies, and Gentlemen—My first words must be of apology to you, for having come in some sort under false pretences to-night. I have understood that in connection with the Society a few remarks are not infrequently addressed from those who are connected with it officially or otherwise, and in that connection my friend Mr. Steinthal and others were good enough to give themselves the trouble of a journey to that not very distant land* which you have seen exhibited on the screen, and with their usual energy and successful persuasion they got me to promise that I would what is called say a few words.

Somewhat to my own disappointment, and I confess to my dismay, I have—no doubt wholly owing to misapprehension upon my part—found that this was extended into the announcement that I was to give a lecture upon Canada. Now to that there are two drawbacks—first of all, that at my time of life it is rather late to begin in a new line; and, secondly, a more serious obstacle, that I am afraid had I made notes, physical infirmities—I suppose it is the growth of age—would have prevented me reading them by the light that we have at present. Therefore—and not for the first time—I must ask that

* Knowsley.

my deficiencies may be supplemented by your kindness; and if I am able in the course of a few remarks to interest you with anything of the interest that I feel myself in the close connection between our country and Canada, and in the great future which I do not doubt awaits the great Dominion, then I shall hope that my apologies may have been made in another form, and that your time will not have been altogether wasted.

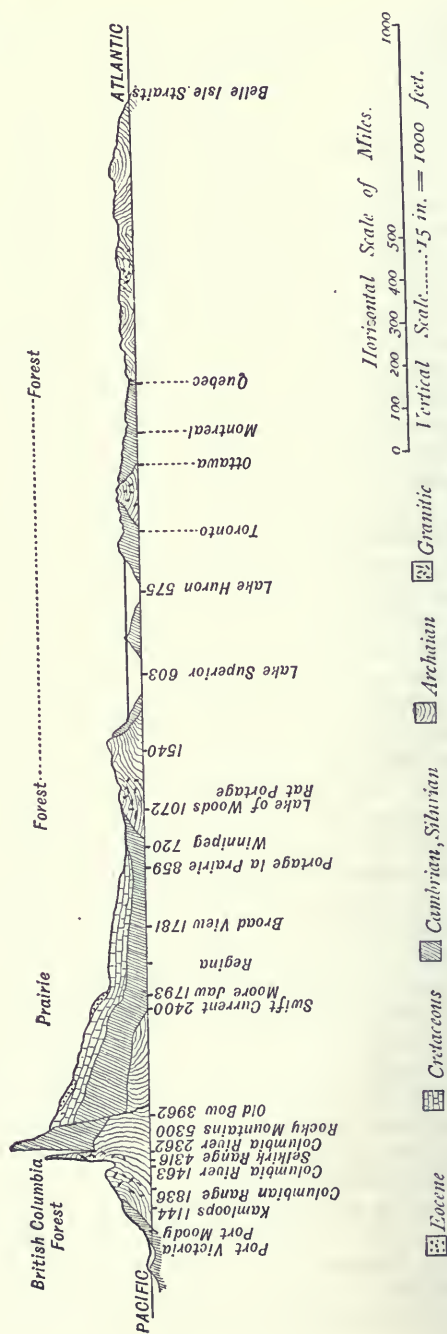
I know very well—possibly by experience—how unpalatable it is to listen to long arrays of figures, to statistics highly important in themselves, but which are, nevertheless, better considered in reference to any particular subject than as matters of interest to a general audience. And, again, I find myself in further difficulty—that I am called upon to lecture, not as an explorer, not as one who has traversed unknown or dangerous or difficult new paths which may be opened up in future to civilisation and to commerce, but as one who, after all, though perhaps with some advantages as to residence, has only done that which many of you sitting here have already done for yourselves, who has only travelled through the Dominion, through the length and breadth of the Dominion, as an ordinary traveller, and who cannot therefore have anything new and startling—unless, indeed, I drew, as I do not mean to draw, upon my imagination. I have not got anything new or startling to tell you. Therefore, if in touching upon the leading subjects of interest I feel that there is anything which can be supplemented by the information of the Canadian Government, I venture to pledge them beforehand—although I have no official authority to do so—to give any details, any further information which may be necessary to complete these particulars of my subject. I think the first thing which strikes one upon arriving in Canada is, after you have passed the French provinces, the extreme similarity to our own country. We find there—and people coming from the States from the South say the same—we find that it is in substance an England beyond the seas. I would not use that term expressly in connection with Canada, because it must be remembered that Canada, with a wise and liberal judgment has opened her arms to emigrants of any country, of almost any class and without distinction of race or creed, provided only they come with the intention of becoming law-abiding citizens of Canada. Population, it is true, has not increased in Canada during the last decade in the same relation that it has in former times—in the previous ten years; but, on the whole, every evidence points to solid and steady progress and to the opening up of still further trade and commercial routes, which in future years may be still further developed. When I speak of the population not increasing, it must be remembered that there is always from the poorer classes of the population of Canada a very heavy draft

into the United States, principally, though not entirely, from the French-Canadian provinces. I spoke of a population diminishing. That is certainly not the fault of the French population, for the large families in Lower Canada are to us, and still more to European countries, almost phenomenal. Not many years ago a Bill was introduced, and passed through the Canadian Houses of Parliament, by a former French-Canadian Prime Minister, which gave—from the colonist's point of view—to every head of a family, every father of a family who had 12 children, a hundred acres of land free of expense. Twelve! It would surprise you to hear that in an official return, interesting in itself, but which I will not of course quote, the applications for those farms, which had to be fully established and upon responsible evidence—the applications and probably the grants for those farms mounted up a long way into four figures, and amongst the French population—for it was confined to them—the numbers were not infrequently in a family 14, 15, and 17, and, in many cases, passing even to 20. Whether that be a question of heredity, whether it be a question of race, is for other societies than our own to determine. But, notwithstanding this great increase in the French population, it is perhaps more than compensated by those who are attracted by permanent work to other parts of the continent of America. The drawback of Canada, of course in some respects, is that many outdoor operations have to be comparatively suspended during a certain portion of the year. I always think that Lord Lorne, one of my predecessors, was perfectly right when he complained of the photographers, and when he said they did Canada a very evil turn. There are there able and excellent photographers to whom every one coming to Montreal, especially in the winter and sometimes other times, thinks it necessary to sit; and it is a part of the performance that people wrap themselves, regardless of the time of year, for the occasion in every description of winter garment, and are generally covered with cotton wool or rags, in the proper habiliments of a winter season. That has conveyed, and without suggesting—it has conveyed to many minds the impression that Canada is a country of perpetual ice and snow; the fact being that the climate, so far as I am a judge, and speaking of the continent generally, is very much like our own climate, only a little more so. The air is clear—in that respect perhaps in Lancashire we had better not say too much as to similarity—but the air is clear, and whether from that or from other causes, the heat in summer and the cold in winter are not to be trifled with in the same manner that we can despise them at home. But the cold of Canada is a dry cold. It is one which is healthy to persons of reasonable habit of body; it is one which prevents no out-door employment, except such as is precluded by snow and ice. The weather

HORIZONTAL SECTION THROUGH THE BRITISH DOMINION

MAINLY ALONG THE LINE OF

THE CANADIAN PACIFIC RAILWAY.



(Reprinted by permission of Professor W. Boyd Dawkins, M.A., F.R.S.)

in itself forms no bar to out-door employment; and, on the other hand, the days in summer—though there are some days on which labour occasionally has to be suspended during the middle of the day—do not in any way vie with the tropical heat which is experienced a few degrees further south. When I am speaking of a continent, or a portion of a continent, which is only about 200,000 square miles less than the continent of Europe; when I am speaking of that which ranges from a temperature warm enough to ripen the grapes for wine purposes in summer, as in the south portions of Europe, ranges from that to the temperature, whatever it may be, of the North Pole; and when I say that it extends across from the Atlantic to the Pacific Ocean, you will easily understand how difficult it is to generalise about such a country. Therefore, if I take a few of the leading characteristics of the different provinces, and if I endeavour, merely with a practical view, to point out what may be the relative advantages to any who may be thinking for themselves or their friends, to send fresh emigrants to Canada, I do so very gravely, and necessarily only in a somewhat perfunctory manner.

Starting from the maritime provinces which we reach first, you will find a country not diversified by any high elevations, a country rich in itself, densely wooded, and for the most part capable of agricultural development if only the land was clear. I don't speak from actual experience of that portion of the country, but speaking of a little further north, on the other side of the Bay des Chaleurs, the cost of clearing land would be about forty dollars or something like that an acre, that is including what is called the removing of the stumps also. That is speaking of the clearing of land apart from the intrinsic price, which would vary according to situation, from it might be ten to as low as two dollars an acre. All the lower land in the maritime provinces is for the most part capable of agricultural development, and really only awaits energy and enterprise to turn it to its proper account. But countries, like ladies' dresses, have fashions, and the fashions have gravitated of late years somewhat towards the West, of which I will say a word later.

Round the coast of the maritime provinces there are numerous indentations, beautiful harbours, awaiting only a traffic which at the present moment is not—everyone is bound to confess—very fully developed. The wood shipbuilding, which was formerly an industry in common with the maritime provinces of Canada and of the coast of Maine, though it has of late years experienced a slight rise, has nevertheless declined, mainly, I have no doubt, from the same causes which have influenced wooden shipbuilding all over the world. In that respect the provinces might have had somewhat of a set-back; but, on the other hand, every day fresh industries are being developed, and of the capabilities of the provinces there can be little or no

doubt. In Cape Breton, near Sydney, and in the neighbourhood of Spring Hill, south of Amherst, in Nova Scotia, the coalmines—equal, I believe, to our own, and of depth of seam practically almost unascertainable—are available for a full and principal supply of the soft coal used for commercial purposes. There seems, therefore, notwithstanding the more general absence of the water-power which is found in a greater extent in Central Canada, unrivalled opportunities for development when the country becomes a little more opened up. As you know very well, it is a dangerous thing, and especially for one who has been in the position which I once had the honour to occupy, to contrast one place against another, or even to say anything which would imply commercial rivalry. I do not know, for instance, that I should choose here to expatiate upon the benefits of Liverpool as a port; nor do I know that I should like at Liverpool to speak of the danger which in future they may encounter now that you, sir, and others have opened a sea port. In the same way you will pardon me if I decline to contrast the two principal rivals for the Eastern traffic—the deep-water harbours of St. John, in New Brunswick, and of Halifax, in Nova Scotia. Halifax, by its position, by the comparative absence of the fogs which beset the Bay of Fundy, and in some part from its occupation for military purposes, has up to now been the port of call for the steamers which trade directly with Canada, and for the most part, indeed I believe almost without exception, it is open throughout the winter. The same applies, I believe, with equal truth to the harbour of St. John—beautiful harbours in both cases, and free from the difficulty to which the more northern harbours are exposed, namely, the difficulty of being beset by ice in winter. I do not know whether, amongst other publications which are in circulation, there has reached the hands of any of those present a year book, of which I received a copy only a few days ago from the Agricultural Department of the Canadian Government.* You will there see very plainly set out for a period of years the mean time of the opening and the closing of harbours, the specific time of closing of the navigation both in the St. Lawrence and in the lakes on particular dates, and it is a matter that clearly proves by those figures that the navigation is not suspended for anything like the period which it is generally supposed in this country. The difficulty may, perhaps, arise with shippers from a distance not being willing to make a late voyage and finding the navigation closed before their ships can arrive.

Well, having passed through the maritime provinces with their rich stores of coal—I may say a store of other metals also—I may venture to take you by way of the St. Lawrence up past the

* This book, with a very large collection of pamphlets and several fine maps, have been placed in the Library of the Society for reference by the Government of Canada.

French provinces, and up towards the busy centre of Canada. The waterway, commencing with the St. Lawrence, is one which, I think—if I may speak to those who have not seen it—is one which cannot fail to impress you. When you have travelled up for some distance; when you have passed that which is supposed to be the outer headland, if such there be of the river; when you see a ship, as I have seen it, hull down—that is to say, her hull hidden by the curvature of the surface, and therefore presumably something like some seven or eight miles it may be distant; and when you are told that that ship is riding at anchor only in another branch of the same river which you yourselves are traversing, then you begin to realise what is the width of the Transatlantic river which runs alongside Quebec. Passing up through various nautical difficulties, now no longer to be called dangers because of the excellent lighting of the river, ships of the largest tonnage lie alongside the wharves at Quebec. The citadel which still dominates Quebec, fast passing into the hands of the antiquarian rather than of the soldier, looks down on to the St. Lawrence; and, from the windows of the houses there, it appears as if a biscuit could be cast upon the decks of the ship, and practically they are hardly beyond the reach of a stone thrown by an active boy. Though the ships are of the largest tonnage they lie afloat at all times, and not only is the water of sufficient depth there to carry them, but the navigation has now so improved by dredging out the shallow lake through which the rivers are forced down into Montreal, that Montreal has now become the head of the ocean navigation; and, when I left, there was a channel of from 620ft. to 700ft., which was passable for large ships at all times and for all people. Above that, of course, the navigation is interrupted by the first rapid, which ships pass by a canal, which is practically a ship canal, though not on such a scale as yours. The upper waters of the St. Lawrence afford a still further waterway to Lake Ontario, and from thence by a succession of lakes and communicating by the canal, a waterway of something like, I think, 2,300 miles, is terminated by arrival at the port of Port Arthur or of Port William at the extreme end of Lake Superior. I may be allowed in this connection to say that passing through the St. Clair river—one of the connections between the lakes—one is struck by the enormous amount of large lake schooners as they are called, the principal vessels having what is called a fore-and-aft rig, *i.e.*, the sail set in the same frame as the keel, but of tonnage which certainly would do no discredit to some of the largest ocean sailing vessels. These are towed up in a long train, and, to give you an evidence of the amount of traffic which passes by, I was told when I was at Point Edward, on the St. Clair, now some four years ago, that, according to the last returns, during the seven months that

navigation had been fully opened, a greater tonnage passed through it than passes in the full year through the Suez Canal. Now, that is a way which is free to all, and which is capable of indefinite expansion. Canada is alive to the importance of her navigation, and I think a slight portion of the burden rests with us on this side to see that advantages freely tendered to us are amply made use of.

Now I pass, with your permission—putting aside the French provinces, which are interesting in themselves, which Frenchmen tell us are a reproduction of the Normandy of 100, 150, or 200 years ago, and are inhabited by a contented and a simple peasantry, people cheerful and hospitable, but not, perhaps, for the most part inclined to advance themselves in life—passing them by, we come to that which is the central portion of Canada, in which English and European capital has, perhaps, been longest invested, and where, perhaps, it is receiving a return under conditions more closely assimilating to our own than in any other parts of the country. Those who have seen the city of Toronto will feel, I dare say, as I have done, that there is very much which recalls the streets and the business of our own cities in Lancashire. It is true that you can see the sun by day and the stars by night, and that is not always so in Lancashire. It is true also that there is this difference, that it is no doubt on a smaller scale; but, judging from the large number of Lancashire men whom I have had the pleasure to meet there, who are settled in very large numbers, it appears to be a place where energy and ability are likely to find a good home. The older portions of Ontario were principally taken up, in the first instance, for farming. People had to clear the land of the forest. That has for the most part disappeared; and the land occupied by the first settlers, or more likely by their descendants in the first or second generation, is now undergoing a singular change, owing to that fashion to which I alluded a short time ago. When Manitoba, still further west, first was opened to the settler, a great many of the younger men went out west at once instead of remaining upon the paternal farm; and in many cases they have made their own homes, and do not feel inclined to return to the older portion of the country, and, on the other hand, many of those who are holding the farms are, through that which we must all yield to, namely, the influence of “*anno domini*,” content to give up the active work of a farm, and are either letting their holdings or are anxious to dispose of them. Now, if there be any one here who thinks of settling in Canada, and does not want to encounter the hardships of a new life, of a life altogether under primitive conditions, I should say stop a few days on your way and see whether there are not in the older parts of Ontario many counties in which you could find a home,

as it were, almost ready made for you. Farms are well equipped, they are cleared, they are ready fenced, they have, for the most part, good buildings, and such farms, so far as I can remember, can in many parts of the country be purchased at the rate of something like 80 to 100 dollars an acre. They do not run to a great size, for the most part—probably about 100 acres would be the outside. There an intending settler would feel that he was not altogether in a new country. The buildings, true, in many cases are of wood, but they resemble our own. The farms and the system of farming is not dissimilar; and there are many accessories of civilisation, such as churches, post-offices, railway communication, roads of a better sort than in some other parts, and general facilities, of course, for education and religion, which do not and cannot exist in an entirely new country; and I think that many people who are very home sick if placed upon the prairies—placed upon the open prairie, fertile as it might be in future years—would find they did well to settle in the older provinces of Canada, where things are to a certain extent ready made to their hand, where the rough of the work has been taken off, and where they would not find themselves under the same condition of solitude that they might if they settled out at the extreme far west of civilisation.

I must not forget that time is going on, and I must ask you to pass with me to that which we have heard so much of, namely, the Province of Manitoba. When I speak of Manitoba, I speak of what is at present the great wheat-growing ground of the Dominion of Canada. I am not sure for my own part that the business has not been a little overdone. I dare say there are some here who remember that not so many years ago that country was all under the domination of the Hudson's Bay Company. They were not anxious that persons should penetrate into that which they kept—from their own point of view quite rightly—as a great preserve and great hunting-ground. Indeed, I think I remember hearing it advanced, or seeing that it was advanced in evidence, that at that time it was utterly impossible to get anything to ripen at all west of Lake Superior. Yet that place where nothing would ripen is the place which has become the great wheat-producing country of Canada, a fertile soil of unlimited depth, apparently for many years of unlimited fertility. I am afraid it is suffering, that the willing earth is suffering—as willing people very often do—by having rather more put upon it than it deserves to bear. And, no doubt, the competition in wheat-growing has been of late years an extremely severe one, and one which, according to the farmers' account—who are proverbial grumblers—yields little or no return. I, for my own part, should not regret if that were the case, because it might lead to a system of mixed farming, far sounder in itself than one which by dividing the risk, and

dividing the profit we hope also, on different items of farming, would not be exposed to that danger which must necessarily attach to putting all your money into one line of business, or what is commonly conventionally called "putting all the eggs in one basket." But the Dominion Government, it is fair to say, have been doing their very best by experimental farms and otherwise to see what can be done in procuring the best seed suited for the Manitoban climate. It is a fine climate enough, and the land is open and easily worked; there are no forests to clear away, and there is nothing to prevent a man putting a plough into the ground on his first arrival there; but the difficulty is the early frost, and the early frost unfortunately is that which has proved in many cases very disastrous to many farmers in that part of the country. The Dominion Government, exercising a paternal care, which we do not hear of, has spent large sums of money and a considerable amount of time in experimenting upon various forms of wheat which will ripen somewhat sooner than those which are now in use. I don't know if those who are present here are acquainted with the fact, but I believe that it is admitted, at all events in Canada, that the farther north you can get wheat to ripen at all probably the better is the grain for milling purposes. The Canadian Government have made careful experiments by selected grain, to try if they could obtain from a variety of Russian wheat, wheat which would ripen some fortnight earlier, and which, therefore, just escaped the critical time when a farmer is sometimes caught by the early frost. The director of the experiment, Professor Saunders—a man of great ability—told me shortly before I left the country that the recent experiments were likely to be extremely successful; but I have heard, on the other hand, that they are not successful, that the new kind of wheat is not of a class which becomes a first-class milling wheat, and it is required to be mixed, it is said largely mixed, with other sorts before it can be applied for milling purposes generally.

The prairies still exist. The prairies as you know, however, are no longer the home of the buffalo, and, to a certain extent, are no longer the home of the Indian; but, to show how rapidly civilisation increases, especially under the careful and judicious management of the Indian tribes by the Canadian Government—to show how rapidly civilisation increases, the Cree country, which I suppose ten years ago it would have been difficult to travel about in, without a strong escort, is practically for all purposes as safe as, possibly even safer than, part of your own city. The Crees have adopted agriculture and are becoming proficient in it; and, as is the duty of the Governor General, he held on his arrival among the different Indian tribes what is described by the name of a "Pow-wow," that is, in other words,

a sort of formal or official meeting. It is a curious contrast, and it was one of the many sharp contrasts which you meet on that side, that after the usual sort of pomp and ceremony, and after being received by a large number of Indians of the Cree tribe who had collected together in their lodges or dwellings, and who were dressed in the costume which we are accustomed to see in pictures, the interview which took place mainly turned upon very business-like and commercial questions. I am free to say that I was entirely in the hands of the interpreter as to what took place on the occasion. I don't talk Cree and the Crees don't talk English, and therefore, allowing for all defects of the means of intercourse, one can only take general results. But the Crees were most business-like. They asked for what they required for purposes of their reserve, and—this is the point which especially marked the civilisation—one of their chief demands was that they should have set up for them a steam mill, so that they might not have to go 16 miles to the neighbouring settlement to grind their wheat. They coupled it also with an extremely business-like remark as to their desire that surveyors should get out of the country. It was my duty officially to point out that a surveyor was a harmless and necessary product of the time; but they said, "That would be true, but we notice that a very short time afterwards the white men come and take our farms." That, I believe, was perhaps a little figure of exaggeration, for, in fact—and perhaps this is no bad place to make the statement—there is no Government which has been more successful in its dealing with the Indians than has the Dominion Government. The way, it is fair to say, was paved by the Hudson's Bay Company. The Hudson's Bay Company made their profit—all traders do. The very motto of their company showed the risk that they were prepared to run. "Pro Pelle Cutem" was the motto of the Hudson's Bay Company, meaning, in other words, "I will risk my skin to obtain furs", and their mode of trading was fair and was honest; and the reputation exercised by the influence of the Hudson's Bay post has continued long after their departure, and have been succeeded by the Government agents. The Indians are allowed a certain amount. They are allotted a reserve which no person is allowed—not even the surveyor is allowed—to interfere with or to purchase, except under a deed, which must be signed after being approved by the Council, and which must be assented to by the Minister for Indian Affairs and by the Dominion Government, and practically there is every safeguard against their land being appropriated. The Government further gives them a grant of food, and of clothes, blankets, and so forth; and an Indian agent is appointed who superintends the distribution, and who acts as intermediary between them and the Government for all purposes of complaints.

Passing from the Cree country, which is the civilised portion of the prairies, I will not weary you by a recital of how many miles of rolling prairie are passed before you reach the vicinity of the Rocky Mountains. Before we reach the cattle mountain chain we come to that which has, perhaps, up to the present time been the best of what is called the ranche country; indeed, a few years ago we heard a great deal of cattle ranching. There were great profits made. The Dominion Government leased vast tracts of land, perhaps as much as 100,000 acres, to a single company at practically nominal prices; and these vast ranches supported herds of cattle, which were attended by cowboys as they are commonly called, and which are superintended from the different ranches. The herds of cattle are rounded up in the spring and autumn and are branded, and it is perhaps a good deal safer—certainly south of our line it is a good deal safer—to kill a man than to interfere with a brand of cattle or to steal a horse. It is a rough justice which is obliged to have play in such communities. But gradually cattle ranching is dying out. It has not, it is true, suffered any very great reverses, but the profits are not what they were; and great as the cattle trade is, it has now become within a measurable number of years concentrated into practically large cattle farms, which will probably be fenced and treated under conditions not largely differing from our own land at home. The Dominion Government is gradually withdrawing the leases, or offering leases for a limited period only—in many cases in withdrawing the leases, first offering an absolute out-and-out sale at a certain percentage, I think 10 per cent of the land capital—at very fair and reasonable prices. Whether that will be availed of, whether these large farms will be stereotyped as part of the country, is a problem which is yet uncertain, or was still uncertain at all events when I left Canada.

But, as we leave the prairies, so once more we get into the mineral country. The resources of British Columbia are probably, even to geologists at the present moment, of unknown quantity. Suffice it to say, that gold, silver, coal, iron, and many other minerals, which are useful for purposes of manufacture and of commerce, are there found in quantities of which only an approximate estimate can be gained. I myself have seen, while in that ranche country, on the side of one of the rivers not very far from a place called Lethbridge—I have seen a coal seam cropping out with an entrance from the side of the river, an entrance very slightly lower than that screen,* and into which a loaded cart or a loaded wagon could have been driven for some distance with entire facility. That coal field is stated to be of the same depth, and certainly has been tested for 18

* About 16ft. in height from the floor.

miles in one direction. And that is, perhaps, only a slight instance of some of the mineral wealth which is beginning to be unlocked in Canada. It is the only case in which I have seen a peculiar kind of ballast applied to railway. Every part of the line—a small branch line, which has since been developed—was actually ballasted with coal fully capable of being burnt in any furnace in this city. That line will probably form a southernmost route through the chain of the Rocky Mountains.

I am not allowed, ladies and gentlemen, at this hour to take you into such geography as is involved as to the dispute in the relative importance of the different passes in the chain of the Rocky Mountains. Suffice it to say, that after many extensions the Canadian Pacific Railway—a wonder of modern civilisation—was carried, at a height, I think, of about 5,000ft. from the level of the sea, through a pass known as Kicking Horse Pass. From that it goes through most magnificent scenery. It runs westward by the Thompson River, and ultimately to the Fraser River. The Fraser River falls down through the valley of the Fraser until it strikes the shores of the Pacific. All the country is rich and full of minerals; but there is no doubt that the gradients for me very severe impediment to the development of traffic, for in some places they amount to as much as 4 per cent, and in many cases to 1 and $1\frac{1}{2}$, and naturally in drawing heavy mineral traffic that cost must for some time prove a very heavy disadvantage. The line from Lethbridge will probably be pushed on through a pass to the south of Kootenai Valley, and the accounts which I have heard of the Kootenai Valley lead one to believe that it fully equals, if it does not even surpass, the mineral regions which have already been found in British Columbia.

Vancouver Island, always to be borne in mind distinct from Vancouver which is on the mainland, is the furthest point, of course, of our possessions. It is separated by a channel of something like 30 or 40 miles. At the southernmost point from the Continent it gradually approaches the mainland at an angle towards the northern extremity, and there are many persons who believe that the coal mines of Nandimo—certainly equal to those of which I have already spoken—will find a ready outlet by a railway, possibly with a short ferry across, and by a line even further north than that of the present Pacific line. If that be so, the Rocky Mountains will be pierced by three rival routes, each of sufficient distance, if civilisation increases, each at a sufficient distance not materially to interfere the one with the other, and each opening up vast tracts of new country practically hardly explored, except by the hunter. Now, there is—and this is perhaps the point to which I ought to have addressed myself sooner—there is an opportunity for members of the Geographical Society, who wish to earn renown, in doing that valuable though less exciting one of clearing up doubts which

exist, and of developing the survey of a country which, even now, is but imperfectly surveyed. There are great questions, in which Geography may play a prominent part, with which the future of Canada is closely bound up. There is the matter of a route from Winnipeg to the shores of James Bay and Hudson Bay. There is again, through the Saguenay, a route which has recently been opened up by the Government of Quebec, and which practically, except by Indians, is scarcely at all explored. The Saguenay was early settled. It was one of the earliest posts, and the fur trade and the lumber or timber trade was prosecuted up to the shores of Lake St. John for a considerable time past, but recently the Quebec Government have opened up a line of railway—I think the details are amongst those which will be given you here—about 100 miles through the virgin forests, connecting Lake St. John directly with the City of Quebec. That has been done as an experiment for French colonists. I dare say not a few of those fathers of families will find their home on the shores of Lake St. John. The lake itself is about 40 miles long, more or less—perhaps rather more—and it is believed that from that there is a chain of lakes of which this is only one, and which, I believe, will open up a fresh-water communication northward through that point at Lake St. John. There are those, especially the French members of the community, who believe that a railway may be constructed to Ottawa, many miles north of the present main lines of railway, but parallel to them; and in future, it is thought, that if they be continued even further west you will have the whole country grid-ironed up from east to west, broken up into squares, and probably in each case with vast ranges of new country brought into development. At the present moment I believe the Canadian Government have gone ahead with the railways quite as far as is consistent with prudence; they would be wiser in making good the ground nearer the present lines than in developing new lines of traffic. But it is impossible—in looking to the general future of Canada—it is impossible to leave out of sight the further measures of development in which, through survey and through exploration, Geography may have a considerable part to play.

Ladies and gentlemen, I am sorry indeed that the importance of my subject, and the deep interest in it, should have led me to forget that time will fly, even though the subject may be interesting, and I must now draw my remarks to a close.

I dare say it will be open to my critics in the press to say—of one who has spoken without written notes—to say, “If Lord Derby has very often lectured when he ought to have spoken, he has this time spoken when he ought to have lectured.” My apology has already been made, and I do not mean to repeat it. There are many subjects upon which I would gladly speak—of

the development of Canada, of its neighbours, of its utilisation of modern resources, and, in a word, of the spirit of progress which seems to animate many of its principal counties and provinces, but the time is not now; and if I have been enabled to interest you, to give you any further inducement to look into the question for yourselves, then I shall feel that I have not intruded upon you wholly without cause, and I shall feel at least that I have endeavoured to make the best returns in my power to the Dominion Government and to Canada, which has treated me so well.

Those of you who may feel tempted to cross to the other side will find yourselves amongst people like ourselves—people eager and keen in business, well educated, with all the latest modern developments of science, instructed in universities in no way inferior to our own, living in a community where poverty is practically unknown to those who are not incapacitated either by age or by infirmity, in a community where there is, perhaps, practically an absence of any very prominent amount of capital. There is, on the other hand, that wide and general diffusion of comfort and of moderate wealth which, I believe, is the ideal of all commonwealths. You will find yourselves amongst those who will receive you with open arms, who will give you information to the best of their power, and who, no doubt, will advance your interests at the same time in a manner consistent with their own. But let me say one word of advice, as I have said elsewhere, to those who may be tempted upon further study of the information given them in print here, to invest any money, or still more capital and skill in operations in Canada. Do not do yourselves and Canada an injustice at the same time by throwing your money across the water, and then expecting it to take care of itself. Business will no more thrive on the other side of the water than it will here, if you grudge it that share of personal attention and of moderate care which you would certainly not grudge to your business here or any branch of it in Europe; and I cannot help thinking that in time past Canada has been somewhat unjustly blamed, sometimes where little ventures begun with insufficient knowledge, carried on with insufficient care and skill, have not resulted in a manner which their original promoters intended; but for those who are willing to take such moderate pains, I believe there is upon the other side of the Atlantic a field open for legitimate speculation and for the pushing of commercial enterprise to which practically the globe can offer no rival. You live under conditions there of entire freedom. The Dominion Government retains within its own hands these central powers, which are necessary; while the central authority delegates to the provinces all that freedom which is necessary for their own internal affairs. The promotion of commerce, of agriculture, of marine, and fisheries

are branches of departments of the Government which certainly exercises a far more direct influence and a more fostering care than that to which we are accustomed on this side; and I believe that, utilising the advantages which Providence has given, and the advantages which skill and brains of man have developed, there is in Canada every element of the success of a great, prosperous, and free commercial country.

In this Society may I add one word of hope that Geography may not lose sight of its practical side, and if there are those who attempt to become amateur explorers, whether on their own account or simply on the account of science, let me say that there awaits before them a wide field in which they may verify the discovery of others—an important task in itself—and which possibly may find new developments of their own.

Again, ladies and gentlemen, I once more apologise to you for the length of time taken, and I can only plead that I am not speaking on my own behalf, but on that of a country for which I always entertain a sincere regard, and for which now certainly I entertain no less a degree of affection. There is an old French song. The burden of the song—of an old canoe song in French words, which I will very imperfectly translate—the burden of the song is—

It is long that I have loved you,
Never, never, will I forget you.

These are the words with which I leave Canada in the hands of the Geographical Society.

A few illustrative figures from "The Statistical Year Book of Canada, 1893," will be of interest:—

POPULATION OF CANADA.

| | |
|-----------|-----------|
| 1871..... | 3,635,024 |
| 1881..... | 4,324,810 |
| 1891..... | 4,833,239 |

VESSELS BUILT AND REGISTERED IN CANADA.

| | No. | Tonnage. |
|-----------|-----|----------|
| 1874..... | 490 | 183,010 |
| 1884..... | 387 | 72,411 |
| 1893..... | 362 | 28,440 |

VESSELS SOLD TO OTHER COUNTRIES.

| | Tons. | Price—Dollars. |
|-----------|--------|----------------|
| 1874..... | — | — |
| 1884..... | 17,368 | 416,756 |
| 1893..... | 31,317 | 363,916 |

The average value per ton for some years after 1874 was about 34 dollars; in 1893, the value was 12 dollars per ton. At the prices realised in 1876-3, the ships sold in 1893 would have realised 700,862 more dollars than they actually did.

The Cost of the Construction, Repairs, and Maintenance of the following Canals and Waterways has been, from 1888 to 1893, as under :—

| | Dollars. |
|------------------------------|------------|
| Lachine..... | 9,865,528 |
| Beauharnois..... | 1,754,496 |
| Soulanges | 264,572 |
| Cornwall | 4,710,225 |
| Williamsburg system..... | 2,947,715 |
| St. Lawrence | 1,041,557 |
| Welland | 24,085,284 |
| Ottawa system..... | 1,220,289 |
| Carillon and Grenville | 4,142,041 |
| Culbute..... | 430,808 |
| Rideau | 4,283,591 |
| Trent | 1,171,534 |
| Chambly system | 216,566 |
| Chambly | 1,036,821 |
| St. Peter's | 734,874 |
| Murray..... | 1,247,870 |
| River Tay..... | 476,878 |
| Sault Ste. Marie | 1,476,294 |

Making a total, with some miscellaneous expenditure of \$61,106,943.

EXPERIMENTAL FARMS.

The establishment of the Experimental Farms of the Dominion of Canada was authorised by Act of Parliament in 1886.

They are five in number, and contain in area about 3,100 acres of land.

There is a Central Experimental Farm located at the capital, Ottawa, and there are four branch farms in other provinces.

The central farm has been established near the boundary line, between Ontario and Quebec, and serves the purpose of both these important provinces.

One of the branch farms is located at Nappan, Nova Scotia, near the dividing line between Nova Scotia and New Brunswick, and serves for the three maritime provinces of Nova Scotia, New Brunswick, and Prince Edward Island.

Another has been established at Brandon, Manitoba, for the provision of Manitoba.

A third at Indian Head, in the provisional territory of Assiniboia, as an aid to agriculture in the North-West Territories; while the fourth is located at Agassiz, British Columbia, where it serves a like purpose for that province.

COAL.

The Coal areas of Canada are estimated at 97,200 square miles, not including areas known, but as yet undeveloped in the far north.

There are, first, the coalfields of Nova Scotia and New Brunswick; second, those of the North-West Territories; third, those of the Rocky Mountains; and fourth, those of British Columbia.

The workable thickness of the coal is very great—in Cape Breton a total of 25ft. to 60ft.; in Pictou at least 70ft.; and in Cumberland at least 30ft.

If the workable area is reduced one-quarter, say from 406,400 acres to 300,000 acres, and the average thickness of the workable area put at 25ft., on the basis of 1,000 tons of coal an acre for every foot of coal, the amount of coal in the measures of Nova Scotia is 7,000,000,000 tons.

* * Maps and diagrams, and further tables will be found in papers by Professor Boyd Dawkins, the Rev. S. A. Steinthal, and Mr. R. Sykes, J.P., in Vol. I. of the *Journal*.

BRITISH NEW GUINEA.

By SIR W. MACGREGOR, K.C.M.G., M.D.

[Addressed to the Society, in the Mayor's Parlour, Town Hall, Manchester.]

WHEN I was invited to read a paper before this Society it was intimated to me that it would be desirable that it should touch chiefly the commercial aspects of British New Guinea, while at the same time the more purely scientific questions connected with that place should not be altogether forgotten. In trying to comply with this, we shall, therefore, consider briefly the country and its surrounding, its people, its present exports, and its potential productions.

Speaking roughly, the island of New Guinea, with its attached small groups, extends from the 129° to the 155° of East Longitude, and from the equator to the 12° of South Latitude. Only something more than a quarter of the great island belongs to the British Empire, but even this fraction is larger than the island on which we now stand.

The latitude of the colony, it is worth while to remember, is from 5° to 12° South — in other words, it is as far from the equator as it is possible for it to be without entering the hurricane zone, a position which, from an economic point of view, must be considered the best possible for a tropical colony.

On the west side we meet the Dutch. They are very friendly neighbours; but, like ourselves, they possess elsewhere a great area of tropical lands in proportion to their small home population, and consequently they make little progress in colonising and settling on New Guinea. By an amicable arrangement with them a natural boundary has been substituted for a geographical one; and they wish to frame such laws as those regulating fisheries and certain other matters, as nearly on the same lines as ours as circumstances will permit of. We can mutually aid each other in this spirit.

North of us we have another kindred race, the Germans, with whom we have a long common inland boundary. Circumstances are different with them. They possess an enormous home population, with only limited tropical possessions; colonisation is new to them, and they are enterprising and persevering, while animated with all the elasticity and spirit of that young giant among nations. They therefore push on colonial settlement and expansion in New Guinea in a way that is not

possible for the British and Dutch. They happened also to secure the portions in which there was most white settlement at the time, and where there are more extensive groves of cocoa-nut trees. It need hardly be said that their government has always been friendly and neighbourly; and we have several times been able to give each other useful information in matters occurring near the frontier.

To the east of us there lie the Solomon Islands, not quite two hundred miles separating the nearest islands from the Possession. They are now a British Protectorate, but are, of course, without any attempt at the formation of any kind of Government. They are officially under the charge of Her Majesty's High Commissioner for the Western Pacific; have, in fact, been so as regards British subjects for the last seventeen years, in the course of which time they have been once visited by a High Commissioner. They possess some trade, especially in copra; but have been largely depopulated by the labour trade to Fiji, New Caledonia, and Queensland. With small additional expense they could be incorporated with British New Guinea, and treated as part of that colony.

South of this lies the great colony of Queensland, the most northerly one of the Australian continent.

Torres Straits, which separates Australia from New Guinea, is only some four or five score of miles wide at one place, and many islands, which, however, at present practically all belong to Queensland, are dotted down in the strait.

There is an intimate political connection between Queensland and the Possession, under which the former colony, as representing also New South Wales and Victoria, has a direct voice in the affairs of British New Guinea. This is only reasonable, because they pay the cost of administration. This connection has been in every way advantageous to the young colony. Ordinary business matters are settled between the Government of Queensland and the Administrator with much greater facility and expedition than could be done with the Colonial Office direct. Of course all matters are finally submitted to the Secretary of State for the Colonies, for, all said and done, British New Guinea is a Crown colony. Intending settlers in the Possession could thus look forward to a double protection against eccentric or capricious legislation in British New Guinea, as it has first of all to be submitted to the clear-headed, practical business men who become premiers of Queensland, and with whose names for some years past you have been well acquainted; and it has finally to be considered in Downing Street.

At first sight you might think this a clumsy way of working. In practice it is no more so than a pre-audit and a final audit of accounts.

Many people regret that British New Guinea is politically connected with Australia; and I have had frequent advice to try to weaken and sever the bond of union.

Personally it seems to me that external defence, economy in internal executive business, and free play to the development of Australia's industries, all require the federation of the great Australian colonies, so that fused now in their infancy they may grow up as one great nation, healthy, strong, and united, framing their institutions to preserve Australia from the political rents and cleavage of the Germany and Italy of the last century. I hope to live to see this federation established and with British New Guinea and the Solomon Islands as its dependencies. To further this it is natural that the connection between Queensland and British New Guinea should be strengthened. Let those who think otherwise remove the Possession on to mid-ocean, for so long as it occupies its present geographical position its destiny of incorporation with Australia is so perfectly plain that it would be unwise to oppose it, unless it were to prevent some great wrong which is not likely to happen.

Beginning at the east end of the Possession, on the mainland, a lofty range of mountains, running towards the north-west, goes from practically one end to the other, presenting many heights of 5,000 to 10,000ft., and attaining in Mount Victoria, the highest point of the grand and majestic Owen Stanley Range, an altitude of 13,000ft. This great mountain system is wooded, is generally steep, and is to a large extent uninhabitable. On account of their height, their great extent from east to west, and their dense covering of vegetation, they are generally cloud-capped some part of the day in all seasons, and collect an immense amount of rain, which sends down rivers that are numerous and greatly out of proportion to the area of the country.

The broadest part of the island of New Guinea is near the longitude of the British-Dutch boundary. Naturally, therefore, our largest rivers occupy that end of the colony. These are the Fly and the Purari. The Fly opens into the sea some 130 miles east from the Dutch boundary, but it trends towards the north-west, and brings down a large amount of water from Dutch and German New Guinea. It is navigable to a steam launch for nearly 500 miles. Gold is found in its sands as soon as those are met with, after an ascent of over 400 miles. There may be some land fifty to eighty miles from its mouth fit for cultivation by Europeans, but this would require special examination. The Purari, like the Fly, is not very inviting to the land seeker, though it is hoped that from it we may obtain good serviceable coal, as it traverses a great sandstone district in which specimens of excellent coal have been found. But good land for growing sugar-cane, corn, or any similar crop; also good

sites on low wooded hills for coffee, tea, and products of that kind are obtainable on several of the gulf rivers, with good water carriage to the spot. In connection with these sago manufactories could be established on some of the rivers, for there are extensive tracts of sago trees that are not required or used by any natives, and that, in fact, having no owner, become Crown property and could be sold or let to any suitable company.

Further east there are many small rivers and salt-water inlets, affording water carriage, and often with good alluvial and hilly land which would be convenient for the planter, and which could be obtained without encroaching on the native or alienating their goodwill in any way.

The north-east coast has three fine rivers, on two of which there is a large amount of sago available for the manufacturer, and the country near the hills is in every way extremely pleasant. The islands would supply some very good places for cocoanut plantations, but they would for other products probably be inferior to the mainland. Generally it may be said that the interior of the country is mountainous; that in front of the mountains in the western quarter the country is low and swampy, and that elsewhere, between the mountains and the sea, there are practically all kinds of soils and positions.

During the period from November to May winds are unsteady and northerly; the temperature is then highest and thunderstorms are of daily recurrence. From June to November a fresh south-east wind blows in from the ocean. The great masses of rock forming the central chain of mountains are so protected by their dense covering of vegetation that they do not become heated by the sun's rays, and they always produce cool currents of air at night. The heat is thus not great for the latitude of the country, probably hardly ever over 90° Fah. in the shade, usually about five to ten degrees below that. Probably white men could hardly work continuously in the sun, but the hardy diggers toil on all day in the Louisiade group, being, however, generally protected from the sun by the forest in which they work. The natives have to do a good deal of labour in some places in order to live, but they do not work steadily, and naturally do not feel ill effects from the climate.

The principal form of sickness is fever, which is of a more tractable and less severe type than tropical fevers generally are. If reasonable care is exercised it would not interfere to any serious extent with planting operations, whilst dysentery, ophthalmia, venereal disease, and other contagious maladies would cause neither loss nor trouble, unless these maladies are introduced from beyond the colony. It is only reasonable to suppose that it could hardly be a favourable place for white children, and probably it is not, speaking generally, a country in which

European families should be reared. It is more a country for outdoor labour by coloured men under white supervision. But under cover a European can work at anything without detriment.

PEOPLE.

The people of New Guinea are of very great interest from many points of view. The island seems to have been left as a sort of shoal between the great currents of commerce that have swept past it, north and south, for generations, leaving the vast island the darkest and least known part of the world. It seems to be almost marvellous that it should so long have remained unnoticed by the traveller, the pirate, the slaver, the trader, and the missionary. While the island was thus neglected and shunned, kept out of the rest of the world like a pariah, its people possessed within themselves none of the elements of internal development. Their social and political condition remained ages behind even the Polynesian Islands. Perhaps at no point on the globe have we ever before seriously and deliberately made systematic efforts to bring into the line of our civilisation a people whose social condition was so primitive.

It was necessary for Australia that the country should become British. At heavy pecuniary sacrifice the three Colonies of Queensland, New South Wales, and Victoria are honestly and courageously endeavouring to civilise it. Probably the political and social condition of the Veddahs of Ceylon, of the Andaman Islanders, and of some hill tribes of India, was not unlike that of New Guinea; but no serious effort has been made to render those an industrious and settled orderly peasantry on their own soil. In British New Guinea the Queen's Government was suddenly proclaimed among a people still in the stone age, among the whole of which there was not one single native who possessed so much authority or influence among his countrymen as to make it worth while to ask his opinion or obtain his assent. A few thousands on the coast-line had been influenced by missionaries, and in the east end barbarous atrocities had been perpetrated by vessels in search of labour for the sugar plantations of Queensland. Although the Polynesians were in the stone age contemporaneously with the Papuans, the former had greatly anticipated the latter in social and political development. It would not be quite safe to say that this arose from the fact that the Polynesians occupied only small islands, and that for this reason they, like the Greeks and Phenicians of old, had more rapid intellectual development on account of their maritime surroundings, favourable to travel and trading. There must be some other factor than this, for the Louisiades and the Bennet group are small islands, and still their inhabitants did not reach a higher, if even as high a state of development, as many of the Papuans on the mainland. On the other hand, in the Kiriwina

group of islands there is found the only approach to a chiefly or ruling caste that the Possession has. There the chief and his family are called "guiao," a word that means "chief" or rich man, while all others are "tokai," a word strongly suggestive of the Fijian "taukei," or landowner. The exceptional case of Kiriwina may be owing to a strong admixture of Polynesian blood in its people, a notion that is favoured by the great number of Polynesian words in their dialect.

Whether the Papuans of British New Guinea are all of the same original stock or not, they undoubtedly possess a great many personal peculiarities which are, though modified here and there, generally characteristic. In customs there are infinite varieties and differences, as might be expected in a country where two or three distinct dialects may sometimes be met with in a score of miles. They are naturally agriculturists, and plant food wherever it is possible for them to do so. But in the western quarter there live between the Purari and the Fly rivers many large tribes that possess no land dry enough for them to plant. But even there the agricultural instinct manifests itself by their growing a few flowers, of which all Papuans are fond, and some tobacco on small platforms, above high-tide mark, generally constructed of fragments of old canoes. Let it therefore be remembered that the native has clearly the tendencies of a husbandman; this has, as a natural consequence, a determination towards fixed residence and to recognised ownership in land.

Generally speaking, therefore, fixed habitation is the rule, but two different conditions lead to frequent change of abodes. Many small hill tribes have large possessions, but few people; when land becomes poor or a place becomes unhealthy, or is haunted, or dangerous, they move to some other spot. On the Fly and west of the Gulf there are large communities with limited and not rich planting lands, while the field for fishing and hunting is extensive. It is customary for those tribes to leave their fixed and permanent abodes for weeks and months, to lead a semi-nomadic life in the district. But of course they still retain their headquarters.

One of the most marked traits of character of the native is his extremely acute avarice. His regard for his individual, personal interest is so great that he could not long be a party in a commercial undertaking or ownership. Each man for himself is the guiding spirit of the Papuan. His instinct as a cultivator, and his avaricious disposition, may perhaps be turned to good account if he can be shown how to grow something at a profit. As a race they are healthy, cheerful, and full of vitality. They are very intelligent, and as servants are generally docile and obedient. They are usually willing to learn, and are, as a rule, easily taught. They could readily be trained to the higher

forms of cultivation, or to work in any manufacturing undertaking. No doubt many of them would work for Europeans, though at present their wants are not great. The chief difficulty in the way is that these people are so warmly attached to family and friends that they do not like to be long absent from home. They enter the married state early, so that few who are able to work on plantations are without some tie of that kind. In many districts, however, they begin to wish to wear clothes, to smoke imported tobacco, to eat tinned meats, biscuits, and rice, and to possess hardware; this stimulates them to work for the white man.

Many employers of coloured labour say that they work best away from home. As the colony has a width of over 900 English miles, and as labourers may be employed from any one part to work in any other part there is ample room in which to employ the native to work far away from home, if thought necessary. But the Papuan seems to work well enough in his own district. They would expect probably about ten shillings a month, with food, lodging, and free transport. If the native is engaged for a period exceeding one month, or if employed to work at a distance from his home exceeding twenty-five miles, the engagement is entered into before the magistrate of the native's district. In many areas of large extent all intertribal wars have been completely suppressed, and the native no longer has that great function on his hands. In many places there is a considerable amount of good land either waste and without any claimant, or unused and not required by natives, and which natives will not utilise without the aid and example of Europeans.

The Government is most anxious that these lands should be occupied, both on account of the general development of the colony as such, and also to find work for the native, whose head and hands cannot long remain idle. He is active, vivacious, and enterprising, and if not otherwise engaged he will soon fall into mischief of some kind. He could readily find employment by leaving his own country, but that is foreign to his instinct and disposition, and would be in the highest degree undesirable for many reasons. He could do more and better work in his own climate, and would at the same time be permanently benefitting his own country. For these reasons the Government would favour and facilitate as far as possible the employment of the natives as labourers in the Possession.

At first there was great difficulty in communicating with the different tribes on account of the diversity of dialect, but that is fast disappearing owing to the large numbers of natives who have picked up a smattering of English through mission teaching, traders, the police, and prisons.

The numbers of the natives can only be guessed at approximately, but it may be from 300,000 to 400,000. It seems clear

that in some of the settled districts the number of young children is very great; and there will undoubtedly result a rapid increase of population if serious epidemic diseases are not introduced from outside.

There would assuredly, however, be many great dangers to the Papuans as a race if they were, like the people of the New Hebrides and Solomon Islands, taken out of their own country and put to labour to which they are unaccustomed in a climate not their own. For this they are constitutionally unfit; but it is a fact that they often work hard in their own country.

PRODUCTS.

The total value of the exports entered at the Custom House in the year ending 30th June, 1894, was, in round numbers, £15,000. To this should probably be added £8,000 or £10,000, representing the value of the pearls not declared outwards. One of the first items to notice is trepang. Its value was £1,714. It may be pointed out at once that the boundary of Queensland as at present fixed extends across the straits to within a hundred and fifty yards of New Guinea, and thus cuts off the fishing ground on the west that should naturally belong to the Possession. In addition to the economic unfairness of this distribution, it gives rise to the awkward fact that officers of the New Colony cannot visit the western part of the Possession without entering Queensland jurisdiction. The Queensland boundary was fixed before the annexation of British New Guinea, and Queensland is now prepared to rectify it. This will add something to the value of the fisheries in the west. The reefs have been fished for years for trepang, and it will in any case only remain as a small industry and not capable of much expansion. Copra was exported to near the value of £3,000. This should in time to come be an export of great dimensions. The cocoanut tree is in all countries most at home near to the sea, and it happens that the Possession has an enormous sea frontage, reaching, according to the estimate made in the office of the Surveyor General of Queensland, something over 3,500 miles. This, of course, includes the sea frontage of both the mainland and the islands. There is no part of the colony in which this tree does not seem to thrive. It certainly bears well up to an altitude of over 3,000ft. It has been planted from time immemorial by the natives, but only on a very small scale in most places. Various reasons have tended to keep the groves small. A weak tribe would only have excited the cupidity and hostility of stronger tribes by growing large quantities. On the other hand, several powerful tribes have valuable plantations. In other places they were cut down as acts of war, a manifestation of power not quite unknown to white men in dealing with natives. In certain districts, again, a man's cocoanut trees

were cut down as a mark of grief when he died, or of joy on the birth of his firstborn. To a large extent these destructive practices have been checked, and all that is possible is being done to urge the natives to extend their plantations. A native regulation has been introduced into operation in the more settled districts to make compulsory the planting of a minimum number of cocoanuts.

A few Europeans are also forming plantations. Some of the trees planted at the Government station in the Mekeo district were flowering before they were quite three years old, but it would not be safe to count on a crop under six or eight years. There is practically unlimited land available for this cultivation, which might be entered into on a large or small scale.

It has already been pointed out that the colony lies just outside the hurricane zone. The advantage that this affords in cocoanut planting, for example, over such places as Fiji, Samoa, and Tonga is enormous. A large cocoanut plantation in British New Guinea when once in bearing would provide one with a perennial source of income. In no country are the trees more prolific; perhaps no other colony we possess offers equally good and extensive opportunities for conducting this industry to high figures. It is a cultivation that could be advantageously carried on by men of even limited capital, though it should not be taken up by a moneyless man. A person who could earn money by fishing or trading part of the year, while devoting his spare time to planting, could in a few years work himself into a cocoanut plantation if he had ordinary good fortune and a small capital to start with.

Gold to the value of £3,900 was entered outward. This was sent from the islands of Misima and Tagula in the *Louisiades*. Of course the amount entered at the custom house does not truly represent the quantity actually obtained, but the work carried on is only on a very small scale. The gold has been found by laboriously washing the sand and gravel in the numerous creeks that meander in the forest, and those have been nearly washed out. There is some reason to expect that gold-bearing reefs may be discovered. Several good veins of auriferous quartz are known, but they are thin and have not, so far as tested, appeared to gain in thickness with depth. On Misima the diggers employ natives to work at sluicing at so much a day, but on Tagula the natives have been setting up on their own account, and wash out gold for themselves.

The search for gold is extremely difficult, owing to the denseness of the forest and the rough and rugged nature of the hills. Strong traces of gold are found on the upper Fly; they are also met with on the Purari, Lakekamu, Angabunga, Goldie, Vanapa, and Mambare rivers. In the east end it has been seen at Yela or Rossel Island, at Duau and Goodenough Islands, and

also at some other places. It is an arduous and difficult journey to ascend the strong-running rivers to the hill districts in which this gold is most generally met with, and it will be a long period before the Possession can be even roughly prospected.

In a country that would be trying for the wives and children of white men the gold industry would not be of so much advantage as in a country like Australia or New Zealand, which are from their geographical position the permanent homes of the white race. Still it could not fail to be of some use to even British New Guinea, although it would not probably add very much to permanent settlement. The Government has had good reason to be satisfied with the treatment of the natives by the diggers from Australia, who are a law-abiding, hard-working set of men, taking them as a whole. The only regret is that the extremely limited means of the Government renders it impossible to offer them any special facilities. It is at best only a fugitive industry in New Guinea, and if the Government had any money to devote to the encouragement of any industries, those of a permanent nature, like agriculture, would deserve a preference. Now that the search for gold has been taken up by the native on his own account, the finding of gold on a small scale will probably never die out, but the native may very likely, sooner or later, lead us on to more extensive deposits. Pearl shell was procured to the value of £3,366. This article is found over a great area of fishing ground in the eastern waters, but unfortunately the sea is often from twenty to thirty fathoms deep where the best shell is found. Several attempts have been made to improve the diving gear, so as to make it safe for picking up shell at those depths, and if this could only be done the pearl shell fishery of the colony would be a valuable one. The waters of the Possession would seem to be well adapted for farming the shell.

The pearls have generally been found in shallow water shells, mostly in the Kiriwina group, not so much in the ordinary pearl shell although found there also. They are obtained by natives, who will soon exhaust the fishery as the shell is easily reached. Probably this shell would be the best one procurable for the cultivation of pearls, as its home is in a small depth of water and it produces many pearls.

Of sandal wood 321 tons, valued at £1,896, left the colony. The market for this article appears to be limited—less than Western Australia alone could supply. It is found in the Possession near shipping ports, and labour is cheap, so that with average prices it can be worked on a small scale at a profit. The supply there, as in all other sandal wood countries, is easily exhaustible, but it will remain a small industry for some time, and will no doubt be taken up by the natives on their own behalf.

The value of imports was £28,500, making a total trade for the year of £43,500.

The principal items imported were: Food stuffs, £7,181; drapery, £2,687; tobacco and cigars, £3,985; hardware, £3,162; beverages, £1,760; and building materials, £2,889.

Food stuffs consist chiefly of rice, meat, and biscuits, imported from Australia.

Drapery is beginning to be used by the natives in certain districts, but it will be many years before they all take to the shirt or loin cloth; those who can afford it take kindly to a jacket and trousers.

They are very fond of tobacco, and in all districts where it is known they prefer the imported American trade article to the home-grown variety, which is simply dried in single leaves, and is not nearly so powerful as the manufactured trade tobacco. No doubt this will for a long time to come continue to be a growing import as we approach new tribes.

The use of hardware is steadily extending, but there are probably hundreds of tribes in the interior who do not yet know the use of iron, but who will use it in a few years.

The native has only a small share in the beverages and building materials imported.

POTENTIAL CAPABILITIES.

To you, perhaps the most interesting, because the most practical, question is, What are the potential capabilities of the country? Can capital be advantageously laid out there?

I believe that money could be employed there to the benefit of the capitalist and to the advantage of the people.

In the fishery this could probably best be done by combining the ordinary diving operations for pearl shell with the farming of leased areas of sea bottom for the cultivation of sponges, pearl shell, and pearl-bearing shell of Kiriwina. The ordinary fishing grounds have not been prospected with any care, but there certainly are many places where these cultivations could be favourably carried on. The sponge used by the natives of Yela Island in the Louisiades for washing the face is a good one, and there is a great lagoon there for the location of sites for cultivation. The men engaged in looking after these establishments could be employed also in the ordinary pearl shell fishery when not required at the stations. The Government would be prepared to lease areas for this purpose on very easy terms.

The search for gold is a matter that each person must decide for himself. The probabilities are that there are other districts than Misima and Tagula that would yield payable gold, but it is at best an uncertain and usually short-lived industry, best

worked by those having local experience. Capital should be put into it only on the deliberate advice of men thoroughly competent to express an opinion in each given case.

The search for gutta-percha and allied products seems to show that a profitable industry could be opened up in that line. Some examples that have been tested have been pronounced of superior quality. These articles are obtained from a number of different trees that are found over a widely extended area. The great want hitherto has been the presence of skilled labour to start the industry. A few hands would have to be brought from some country where this work is already established. Alluvial land could be obtained that would be suitable for the cultivation of rubber trees. The introduced variety is thriving splendidly at Port Moresby.

A cultivation that could in all probability be advantageously cultivated there would be sisal hemp. For three or four years efforts had been made to obtain this plant from the Bahamas; but this could not be done, as that colony apparently wished to retain a monopoly of this cultivation. The Government of Queensland has, however, recently succeeded in obtaining a large number of the plants, from which New Guinea is being supplied. Plants very nearly related to this one, if they are not indeed identical, already flourish at Port Moresby. With rich soil, land at two shillings and sixpence an acre, and with cheap local labour, this cultivation could be made profitable in the colony, if it can be made so anywhere. It is not likely that it could be advantageously grown in Australia, unless there is a great fall in wages there. It would seem to be well adapted, however, in every way for British New Guinea.

As already mentioned, there is great scope for the cultivation of the cocoanut. It is one of the slowest, but one of the surest, forms of tropical cultivation, provided that it is in a country which, like British New Guinea, is outside the hurricane zone. No doubt the most profitable way of working copra will be by direct shipment to Europe. Hitherto it has been sent to Australia, to be carried thence to Europe by reshipment, usually by steamer. But the quantity obtainable will soon be sufficient to allow of direct shipment by sailing vessel, which would greatly reduce expenses connected with freight. The copra trade of the Solomon Islands could probably be brought by way of Samarai for the same direct transport. There are a few unoccupied islands in the east end which are adapted for small plantations of this kind, and land suited for it is obtainable at many places on the other islands and on the mainland. Very favourable sites could be had for converting the cocoanut into oil, butter, and coir yarn. There is undoubtedly in this industry a good field for the investment of capital. It is a cultivation that can be well combined with others.

For growing tea and coffee, land in large quantity is procurable at any altitude that may be desired, and on almost any kind of soil. Tea and coffee, both of the Arabian and Liberian kinds, are already in bearing in the Possession, and both free of coffee leaf disease. The introduction of further coffee seeds and plants has been prohibited by law in order to prevent the importation of disease. Healthy seeds and plants can be obtained by the planter on the spot.

Vanilla grows luxuriantly, and suitable land can be had for its cultivation in abundance.

Few things would seem to offer a more inviting outlet than the cultivation of tobacco in New Guinea. The plant that has long been domesticated is, though small, perhaps one of the finest that can be grown. It has probably come from the Malayan archipelago, as it has certainly reached the very heart of the island, from 5° of South Latitude on the Fly River to as far east as the Owen Stanley Range; but it is still unknown to the north-east coast, and was, until quite lately, not grown on the islands. Very high rates have been offered in the market for the unmanufactured leaf. Like the cocoanut, it is a cultivation well known to the great majority of the natives, and it is a healthy and long established production of the country. It presents a very favourable opening for enterprise.

Rice has been grown by the Mission of the Sacred Heart on a small scale, but sufficient to show that it thrives and bears admirably. For swamp rice, or for any other wet growing crop, there is a great field in the colony, for it contains more than enough of swampy land of all kinds.

It seems very probable that sago could be manufactured profitably by establishments erected on the Lakekamu, Mambare, and Kumusi, and perhaps at other places. Native-made sago would not be suitable for refining, because it is often prepared with brackish water, and is never rewashed. Sago-making apparatus would have to be erected as far up the river as possible, on account of the supply of fresh water. This also would be an industry that would be readily understood by natives.

Land suitable for growing sugar-cane on a large scale could certainly be had at several places. As a very great variety of sugar-canes has been cultivated from time immemorial by the natives, all over the Possession, this plant is thoroughly at home there, and clearly grows to perfection. As the country is not troubled by hurricanes the chief danger to guard against would be from floods, a contingency that should be borne in mind in selecting land. No doubt a considerable amount of local labour could be obtained for growing cane and manufacturing sugar, but probably it would be advantageous to have a permanent nucleus of more skilled labour in such an establishment, from India or elsewhere. There are strong racial and economic

reasons against the introduction of those peoples into Australia; but these do not apply to British New Guinea, which is not, and never can be, a white man's colony in the same sense as Australia.

It is said, however, that the sugar to be grown in Australasia this or next year will suffice for Australasian wants. If this is so a further extension of the sugar-cane industry in that part of the world necessitates looking for a European or American market. British New Guinea, free from hurricanes, with land for next to nothing, with local labour and convenient access to shipping, should be able to compete successfully on even terms with any other place, either for the Australasian or other market. It seems to be more a question between cane and beet sugar than between New Guinea and other colonies that grow sugar-cane.

The central district would seem to be specially suited for growing cotton. It is a dry place, the rainfall probably varying from 40 to 60 inches, and cotton seems to thrive well there. It would be tedious, and quite unnecessary, to pursue further all the different kinds of cultivation that could be followed in the colony. Practically, anything that can be grown in a tropical country could be grown there, so great is the diversity of soil, elevation, and rainfall.

It may be stated, shortly, that there are traders enough in the country already for all the present products. What is wanted now is the man who will raise new products, or extend the range of those already existing.

To facilitate this the labour law has been made as little onerous as possible. The natives would probably expect from 4d. to 6d. a day with food and lodging. No forced labour or levy of labour can be granted by the Government, the policy of which is to leave labour matters as free as is practicable in the present condition of the native; but, as already mentioned, every reasonable encouragement would be given towards employing the men in their own country, it being clearly advantageous for them on social, political, and economical considerations that this should be done. The colony has no preferential trading relations—is, in fact, debarred from having such; and it has not granted, and probably would not grant, any monopoly or exclusive privileges to any individual or company.

The tariff of customs dues is comparatively light. Machinery and building materials are free, and the same may be said of shipping gear. Necessary articles of food are free or are very lightly taxed, like rice, for example, at 10s. a ton, sugar at 2s. 4d. a cwt., and tea at 2d. a lb. Much trade tobacco is used in paying native labour, and the duty on that article is 1s. a lb. On hardware and drapery the duty is at the rate of 10 per centum ad valorem.

Of the rainfall it may be said that in the central district, near the coast, it is the lightest, apparently from about 40 to 80 inches; while in the east and west it rises to 120 inches, or more in some places.

Land can be bought only from those already holding it by Crown grant, or from the Crown direct. If sold subject to reasonable improvement conditions the price need not exceed 2s. 6d. an acre. If alienated by the Crown without conditions, the minimum price per acre is: For agricultural land, 10s.; for pastoral land, 2s.; for trading or fishing purposes, £5; for cocoanuts, 5s.

It is advised that any person or company contemplating taking up any industry in British New Guinea should begin by first of all visiting the country, or sending some person there to do so, in order that a competent and thorough examination should be made on the spot before money is sunk in any undertaking.

The Government certainly cannot in any way indemnify any person who may suffer from any enterprise he may enter into there. In a new country like British New Guinea it would be a real calamity if private enterprise should turn out unfortunately. The fitness of the place for any particular industry should, therefore, from all points of view, be well determined beforehand by competent independent authority. The best plan would probably be to send an experienced planter to examine and select land, and to consider all other matters carefully on the spot before commencing any active operations. If such a person is sent there, and really means business, the probabilities are strong that he will obtain what he wants, and that, too, in districts where life and property would be as safe as it is in this city.

The paper called "*A Visit to New Guinea*," given in the Geographical Section of the British Association, at Oxford, on Monday, August 13th, by Miss Baidon, of Edinburgh, was an account of a voyage from Cooktown in Queensland to Port Moresby, with Mr. Chalmers, the well-known missionary. Miss Baidon and her brother accompanied him there in a small pilot vessel, and then sailed westwards along the coast (150 miles) to Motu-Motu. During their stay at Motu-Motu they made a canoe voyage with Mr. Chalmers up the Williams River to a village called Movi-avi, where the natives are still absolutely in their savage state, and where the party was exposed to no small amount of risk. In spite, however, of the natives being fully armed, and assuming a threatening attitude, the visitors succeeded in keeping the peace, and got away in safety. This was doubtless due to Mr. Chalmers' knowledge of and influence with the natives, and also partly to the presence of a white woman (Miss Baidon being the only woman in the party), as this was regarded as an indication of the pacific intention of the expedition. A number of interesting views were taken there, which served to illustrate the native life and the character of the scenery. After a short stay at Motu-Motu, Miss Baidon and her brother returned to Port Moresby, and thence proceeded eastwards to Kerripuna and Hood Bay, where they were the guests of Mr. and Mrs. Pierce, of the London Missionary Society. From this point they sailed for Cooktown, which they reached in safety, after an absence of about a month.

M. E. A. MARTEL'S STUDY OF SUBTERRANEAN FRANCE.*

[Read to the Members in the Library, and communicated by Miss E. M. CLERKE, London, Corresponding Member.]

"LES ABÎMES" is a splendid volume, profusely illustrated with maps, plans, and pictorial views. The author gives the result of his experiences in a new form of travel. The arcana of the nether world have furnished the subject of his study, and exploration in a vertical direction his special line of adventure. Between the years 1888 and 1893 he, either alone or with the assistance of friends, of whom M. Gabriel Gaupillat was the chief, plunged into the recesses of 230 cavities, grottoes, pits, and subterranean streams, of which 165 were visited by him for the first time. Great nerve and agility were required for these descents, as the difficulties were very great, and the danger either from falling stones, floods, or landslips by no means inconsiderable. The apparatus used consisted of a rope ladder, a second rope with a cross stick on which he could support himself in a sitting position, and a magnetic telephone for maintaining communications with his assistants above ground. An ordinary stearine candle was found the best illuminant, as it fulfilled the second purpose of giving warning of the presence of carbonic acid gas. Matches in a water-tight package were indispensable, and magnesium wire supplied the material for an occasional more brilliant flare up. A collapsible boat, the Osgood, was lowered when subterranean lakes or streams afforded the opportunity for Stygian navigation. All this equipment, together with the tent and other stores used in forming encampments on the scenes of exploration, necessitated the employment of a van and two carts for its transport, while from a dozen to a score of men were usually engaged as assistants. The appearance of this caravan in the desolate regions traversed in its quest usually caused much excitement among the inhabitants, who regarded its proceedings with wonder not unminged with awe. Legend is rife in regard to those yawning pits which seem to open a way to the gulfs of Tartarus, and superstition guards their approaches with terrors which scarcely exaggerate their real dangers. The story of a shepherd who, having discovered that one communicated by underground channels with a fountain near his home, threw down one of his master's sheep at intervals to furnish his domestic larder until despatched on the same road by his irate master on the detec-

* The following papers have been placed in the Library of the Society by M. Martel, and they form the basis for "Les Abîmes": *La Spéléologie*, 1893, 8pp.; *Les Levis topographiques sommaires dans les Explorations de Cavernes*, 7pp., 1892; "Sous Terre" (4th Campaign), 39pp., plans, views, and sections, 1892; ditto (5th Campaign), 39pp., plans and views, 1892 (Martel and Gaupillat); ditto (4th Campaign), 48pp., sections, &c., 1891; ditto (6th Campaign), 23pp., plans, views, &c., 1893; *Sous-Sol des Causses*, 39pp., plans and sections; *Causses du Languedoc*, 39pp., 1890; *Recherches dans le Lot* en 1892 and 1893, 42pp., plans and sections; *La Géologie des Grottes* (Lamey et Martel), 24pp., with sections; *Eaux Souterraines des Causses*, 20pp., plans and sections, 1889; *La Grotte de Saint Marcal d'Ardèche*, 8pp., plans, &c.; *La Rivière Souterraine de Bramabiau*, 1888-92, 27pp., plans and views; *Les Causses*, 15pp., 1886; Six Pamphlets on the Caverns, &c., of the Causses, extracted from the "Comptes Rendus" of the Academy of Sciences, 4pp. each; *Les Aiguilles du Gouter et d'Argentière*, 49pp., illustrations; *Le Linthial et le Tödi*, 11pp., illustrated, 1890; *Les Gorges et Ponts Naturels de L'Argens* (Alpes), Gaupillat, 12pp., illustrated, 1893; *Sparte et le Gorges du Taygète*, 31pp., illustrated, 1891; *Les Katavothres du Péloponèse*, 21pp., plans, 1892; *Nouvelle Carte d'Italie*, au 100,000e, 8pp.; *Carte d'Autriche*, au 75,000e, 6pp., 1886; *En Ballon Libre*, by G. Gaupillat, 22pp., illustrated. These are reprints of papers read to various societies from 1888 to 1893, and are reprinted from their Transactions, and altogether give a very complete account of the work of M. Martel and his friends since 1888.

tion of the theft, recurs in a number of localities; and even more widely diffused is that of the shepherd lost in one with his flock, whose staff floated to light in some distant spot. Such a tale is told of the celebrated fountain of Vaucluse, 15 miles from Avignon, the subject of some of M. Martel's researches. Here the river Sorgue wells forth from a cavern at the foot of a cliff some 700ft. high, forming the scarp of a calcareous plateau. The poetic fame of this source has not saved it from being applied to utilitarian purposes, as the feeder of an irrigation system and the motive power of mills and factories. But the mysterious spring is liable to great fluctuations from a maximum, when it overflows in a copious discharge of 150 cubic metres a second, to a minimum, when it sinks below the threshold of its grotto, and feeds its stream, by percolation through the strata, with scanty dribbles amounting to no more than 5 cubic metres a second. In the hope of controlling these irregularities the engineers of the Department sent down a diver to investigate the inlet of the cavern, and found that it is fed by a conduit with a submerged orifice, from which a rocky tube descends obliquely to a depth of about 30 metres. This fact, however, left the mystery of its ultimate source unsolved, and M. Martel's efforts were next directed to its elucidation. The plateau from beneath which it flows is honeycombed with those gaping chasms called here *avens*, and in other places *tindouls* or *abîmes*, one or more of which might presumably communicate with the hidden stream. It is averred by historians of the last century that a landslip having occurred in one of them in the year 1783, the waters of the source became discoloured with ochreous matter a day or two after, while the ubiquitous legend of the shepherd's staff pointed to a connection with the *aven* of Jean Nouveau. This latter opening was descended by M. Martel in August, 1892, to a depth of 163 metres; but further progress was blocked by a mass of stones and rubbish fallen from the sides, and in default of means of removal of the obstruction the investigation could not be pursued. No water was struck in any of the *avens* descended in this district, and the source of the fountain of Vaucluse remains an enigma still.

In other localities the underground waters were reached and tracked for considerable distances, until the way was barred either by a submerged orifice through which the stream plunged, or by the contraction of its channel to a mere crack or fissure. At the great abyss of Tindoul de la Vayssière, descended in July, 1891, an underground river was found and navigated, with some interruptions, for 1,000 metres from the orifice. After expanding to a small lake the cavern again narrowed to a tunnel completely filled by the stream, which was followed to another lake without discoverable inlet, but evidently fed by a submerged siphon. The opposite end of its course, where it issues to daylight at Salles les Sources, some three miles away, was also navigated by M. Gaupillat for a considerable distance, through a series of lakes, one 100 metres long, and from 1 to 5 in depth. The explorers having purchased the ground in which the great pit of Tindoul is situated, have made its depths accessible to the public by the construction of a series of ladders, which were descended by 200 visitors when opened in July, 1893.

A similar experience awaited the adventurers in their exploration of the great well of Padirac, in the Department of the Lot. Here, after descending a series of shafts to a depth of 200ft., they came upon a beautiful calm river which they navigated for a distance of 2 kilometres through a series of 12 small lakes, filling fairy grottoes hung with fantastic drapery of stalactites. The voyage ended in a *cul-de-sac*, where the stream was lost in the mystery from which it had temporarily emerged.

At Les Combettes in the Causse de Gramat, in the same Department, a torrent with a discharge of 2,000 litres a minute was traced for 200 metres of its course through a narrow gallery with many cascades, to its disappearance under a submerged

arch 90 metres under ground. The circulation of the subterranean waters in the heart of the Causses forms a complicated vascular system, with arteries at different levels.

The *aven* of Remejadon, explored by M. Gaupillat, proved to belong to the same class, being a chimney in the roof of an underground stream. It is supposed to communicate with the fountain of Bourbouillet, a short distance off, as sawdust thrown in by woodcutters in its neighbourhood found its exit there.

Mas Raynal, in Aveyron, a great crevasse narrowing downwards to a depth of 40 to 50 metres, contains a lake 50 to 60 metres in length, discharging a rushing torrent, supposed to escape in the Sorgues d'Aveyron, $2\frac{1}{2}$ kilometres off.

In the face of a cliff near Aveyron are the curious caves of Boundoulaou, a series of clefts at different altitudes, discharging springs at levels varying with the rainfall, and communicating by long galleries with a lake explored in a boat. The upper gallery is now permanently dry, and here were found the remains of seven individuals of various ages, apparently constituting a single family, overwhelmed, according to M. Martel's conjecture, by a sudden rise of the torrent in the cavern in which they had made their home. As it is now accessible only by ladders, their presence there is difficult to account for, except on the supposition of some change in the structure of the cliff.

At the bottom of the *abîme* of Dèves de Reynaud, near St. Remèze, M. Ollier de Marichard found bones of mammoths and all the quaternary fauna at a depth of 52 metres. He was much surprised to come upon a living dog engaged in gnawing the carcase of a horse that had been thrown in, and to see it disappear on his approach into a narrow *couloir*.

Great varieties of structure are exhibited in these pits. That of Vigne Close, in one of the plateaus of the Ardèche, forms a perfect scaffolding of wells, consisting of five consecutive shafts with landing places between, each with a bottle shaped expansion downwards, and having an aggregate depth of 190 metres. The several flights follow a spiral course, and the fourth and fifth end in caverns with very high secondary vertical fissures in their roofs. The exploration of this system of shafts, made on August 26th, 1892, lasted from 8 a.m. till midnight, and the adventurous party dined 140ft. below the surface of the ground.

The maze of grottoes and tunnels reached from some of these openings, often superposed at different levels, represent the burrowings of some underground stream which has now forsaken them to descend to a still lower depth. This is, according to M. Martel's theory, the tendency of all such water-courses, and he sees in it a danger to the districts which depend on their outfalls for irrigation. For this reason he deprecates any tampering with the immediate outlet of sources like that of Vaucluse; any shock to its delicate mechanism might divert its course elsewhere. He believes that the existing subterranean grottoes and caverns are but the enlargement of cracks originally caused by cooling, down which the waters poured, eroding and excavating as they flowed along beds whose slope followed that of the impermeable strata beneath. He discards the supposition of large lake-like expanses of the subterranean waters, and conjectures them to be distributed instead through "a network of currents on long slopes, a labyrinth of galleries, a ramification of regular subterranean rivers, fed more or less directly by the *avens* and their branches, which have not all visible outlets on the surface." In many cases the larger arteries seem to end in capillaries, whose minutely subdivided veins may, perhaps, reunite once more, as the fissures through which they trickle open out into wider arches.

The author's researches form a new departure in hydrography, and promise to be of much practical utility. In one direction they have already borne fruit, for he has

pointed out an unsuspected danger to the public health from the poisoning of the underground waters by the use of the shafts connected with them as ready-made receptacles for every sort of refuse and abomination. He and his party were on one occasion sufferers to this abuse, as several of them were taken ill after thoughtlessly drinking from the fountain of Graudeno, though they had themselves come upon a decaying carcase at the bottom of the *igue* or *aven* of Berrie, where they had struck its underground course 250 metres higher up. He has also directed attention to the possibility of regulating the outflow of many streams by tracking them through their subterranean channels, and either keeping in repair the natural storage basins or preventing the loss of the springs by checking further perforation of their beds. There is little doubt that the system inaugurated by the author of "Les Abîmes" will lead to many further developments in various and, perhaps, unexpected directions.

* * Mr. Martel announces the formation of a "Speleological Society" to consider the question of under-ground waters in all their relations. The subscription is a small one and the "Bulletin" is sent to all subscribing members.

NEW BOOKS.

"SHORT STUDIES IN NATURE KNOWLEDGE. An Introduction to the Science of Physiography." By WM. GEE. London : Macmillan & Co. 327pp. Crown 8vo. Price 3s. 6d. 1895. With 117 illustrations.

THIS is a little book written by Mr. Gee, one of the science teachers of our city. It is a book apparently designed to be a reading book or as a text book. It is a book upon the production of which a good deal of care has been spent, and will be a very pleasant book to the children in the upper classes of our primary schools. There are one or two curious blunders in the book. On page 158 it reads : "Windermere is the finest English lake . . . its superabundant waters are discharged into the Solway." When we saw Windermere the waters drained the other way. No doubt a careful revision will be made for another edition. The book will be a welcome reading book and is made interesting from its popular style, but a little more scientific definiteness is necessary before it can be a satisfactory text book. Does the writer know of the exact and careful survey of the English lakes by Dr. Mill ? A comparative table of size and depth of these lakes with comparison of some foreign lakes would have been of value. Several other points of the like nature suggest themselves in reading the book, but we must not forget it is "an introduction" only, and is a very pleasant one, to the study of physical geography.

"CATALOGUE OF THE ROYAL COLONIAL INSTITUTE. (Founded 1868. Incorporated by Royal Charter, 1882.)" Published by the Institute, Northumberland Avenue, London. 1895. 8vo. 544pp.

THIS is a noble catalogue of a fine collection of books relating to the Colonies. The system adopted is similar to that of the celebrated York Gate catalogue of Mr. W. S. Silver. It is divided into fourteen parts, and under the several headings it is perfectly easy to find the available information respecting each colony. A long list of abbreviations is followed by an index of authors about 8,000 in number, and this is followed by the catalogue, voyages and travels, Australasia, British North America, Africa, East Indies, West Indies, &c., with altogether 70 sub-headings, and concluding with an appendix of the contents of report of the scientific results of the voyage of H.M.S. "Challenger." The book is a handsome contribution to the bibliography of geography, and will be of great service to those who want information.

CHINA AND ITS PEOPLE.

Address by Prof. DOUGLASS to the Tyneside Geographical Society, Friday,
October 19th, 1894.

[Reprinted by permission of the Tyneside Geographical Society.]

THE LECTURER said the war which was now going on between China and Japan had, as their Chairman had pointed out, drawn public attention to a part of the world to which, he was sorry to say, as a rule, very little attention was paid. This fact was the more strange since their mercantile stake in Eastern Asia was enormous, and their possession of India and Burmah gave an overwhelming political importance to their position in that part of the world. It was a common saying that nothing advanced geography more than a war; and nothing had of late years so proved the truth of this as this unhappy contest between Japan and China. At first sight, the odds seemed so vastly in favour of the larger country that people were inclined to conclude that Japan must inevitably be crushed under the heel of the big battalions of China. But those acquainted with the characteristics of the two peoples, and the form of Government which prevailed amongst them, were equally certain that the Chinese giant was destined to fall before the sword of the Japanese giant-killer.

To explain this view it was necessary to consider who the Chinese were, where they came from, and what were their characteristics. The Chinese were Mongoloid. The high cheek bones, the almost beardless face, and the very peculiar eye marked the hordes and tribes that infested the vast tracts of territory in Northern Asia. The Chinese eye was a marked peculiarity of the race. It was the eye of an infant, and it was remarkably typical of their strangely undeveloped character. In every direction they displayed evidence of an arrested intelligence. In their language, in their writings, and in their art and science they reached, at an early age, a considerable degree of excellence; but beyond that point they had been unable to advance. Their language, in the absence of inflexions, presented a picture of primitive speech; while in their writings they began with hieroglyphics like the Egyptians.

The Chinese came into China 2,400 years before Christ; and one strong proof of this fact was that the arts and sciences which they found from the early books of the Chinese were precisely those which distinguished the civilisation of Babylonia. Beyond that point they had of themselves scarcely made any progress whatever. Since the arrival of Jesuit missionaries in the country, two centuries ago, new light had broken in upon the nation; but, up to that time, their astronomy and mathematics were little in advance of that prevailing under the early sovereigns of the race.

On their first arrival from Babylonia in the Flowery Land, they found the country occupied by tribes whom they gradually dispossessed, some by treaty and some few by force of arms. Probably, however, they conquered the natives by exactly the same methods by which they were ousting the storekeepers of Burmah and elsewhere. The Chinese were not a fighting race, as recent events had proved. They were a nation of shopkeepers; and, if ever they overran the world, as some people predicted, they would do it by the more peaceful process of commerce. War was looked upon as a rude pursuit, and fit to be followed only by men of low culture.

It was thoroughly characteristic of the nation that the heroes in their novels were not those who won renown on the field, but those who gained the highest degrees in the examination halls. The result of this contempt for the military profession acted very detrimentally on the army, which, being despised, was badly served by its followers, those in the highest ranks being as a rule careless, ignorant, and corrupt. It was no uncommon sight on a field day to see the officers commanding seated in a tent or marquee drinking tea, while the troops were being manœuvred. Thus, by racial affinity and social training, the people had become possessed of a marked distaste for arms.

Another cause for the present position of the country was to be found in the corrupt system of Government. At the head, over all, stood the Emperor, who, theoretically, occupied a semi-divine position, which, as a rule, was falsified by the dissolute life and debauchery which prevailed in the Palace. The Emperor was Vice-gerent of Heaven, and held the throne by a decree of the Most High. Over his people he held unbounded sway, so long as he acted in accordance with the decrees of Heaven; but, in spite of his lofty prerogatives, there were probably few more miserable men in the world than the Emperor of the Chinese. One of his titles was "the Solitary Man," and that, probably, best described his normal condition; for, although surrounded by flatterers, both male and female, the short span of life which commonly fell to the lot of the Son of Heaven had few of the comforts which usually belonged to kings. At two o'clock in the morning, no matter whether the snow was deep on the ground or the summer dawn was just beginning to strike, his rest was disturbed to receive ministers, whilst by seven or eight in the morning he was prepared to witness a dramatic performance in the Palace theatre, or to offer sacrifice according as the ritual might determine. The conditions under which he lived, cribbed and confined within the walls of the Palace, and surrounded by a race of sycophants, destroyed all that was best in the character of man, and he must be a man of more than ordinary robustness indeed who could resist the temptations besetting him.

Deprived of all personal knowledge of the outer world, the Emperor naturally fell into the hands of those who were best able to flatter and cajole him. So long as matters went right, the illusions remained undisturbed; but when, as lately, things turned out otherwise, when his armies and fleets were defeated, a rude awakening disturbed his slumbers, and gave place to feelings of rage and vengeance. Thus they found that Li Hung Chang had been deprived of his yellow jacket, and Admiral Ting had been obliged to resign his peacock feathers. These punishments were light in comparison to others inflicted on those who had been found guilty of having wilfully misled the Son of Heaven. Now, no doubt, at that moment there were many officials who knew and felt that their heads were by no means secure on their shoulders, and there were some, if they had to have their fate, would unquestionably encounter it on the execution ground. One marked disadvantage of the isolated life of the Emperor was that it made it impossible for his subjects to feel any personal loyalty towards him.

The Emperor of Japan went to the sea coasts to witness the embarkation of his troops, while his brother of China spent his time in wringing his hands and uttering bombastic threats. This spirit was observable in the respective armies; the Japanese were instinct with enthusiasm, whilst the Chinese Commander-in-Chief withdrew from his position because he happened to be suffering from illness, and two other commanders followed his example for no other apparent reason than that they did not want to fight. The administration was controlled by a number of boards and offices at Peking, but the utmost negligence and corruption marked their work. The army was mostly on paper, the arms were allowed to rust and spoil, if they were not

actually sold, and, if war broke out, the troops were got together by the simple expedient of enlisting the riff-raff of the towns and the ne'er-do-wells of the country.

As an instance of the way things were managed, it was found on a gunboat being taken into dock, that a gun was missing which, to that moment, had never been found. The probability was that the commander, never dreaming of a war, had sold it. The lecturer hoped he would get his deserts.

The native drill was contemptible in the extreme, confined mostly to learning to shoot bows and arrows, jumping into the air and shouting; and the troops which had not been trained on European models were, when opposed by Europeans or by modern Japanese battalions, little better than food for powder. Their fortifications, often well constructed on the face, were almost always left unprotected in the rear; and it was this very war-like simplicity which enabled the Japanese to gain so overwhelming a victory with so trifling a loss of life. That was indicative of one of the most hopeless features of the Chinese character. They never seemed to profit by experience; but continued in the old beaten tracks of their forefathers, without even showing the subtlety or instinct of the wildest animal, which learned by past tribulations how to thwart the wiles of the hunter. Despite all the lessons taught her by civilised powers, she would have to expiate her sorrow in being forced to submit to conquest at the hands of the Japanese, for whom they held the most extreme contempt. They considered them a contributory nation, and the diminutive size of the Japanese was a constant source of ridicule to their larger neighbour. They called them the "imps" or "dwarfs," and one of the latest proclamations of the Emperor was for his subjects to "sweep the dwarfs out of their lairs."

Huge public works had been executed in China which would do credit to any nation in the world. Magnificent canals traversed large portions of the country; and handsome highways connected the capital with some of the most distant provinces. To the Board of Works belonged the duty of preserving these evidences of education, enterprise, and industry, but nothing was done to keep them in repair. In most countries the ablest officials were placed at the head of affairs in the capitals. To say this was to imply that in China exactly the opposite held good. The most able administrators had very substantial reasons for seeking employment in the provinces. The official pay of the mandarin, wherever posted, was ridiculously inadequate. Ministers in the capital were unable to fill their pockets with the ease and certainty with which the provincial mandarins provided for their wants, and were dependent on such sums as they were able to wring from their more fortunate brethren. By the way in which the mandarins in the provinces were summoned to Peking, one might think that they were high in Imperial favour. But the explanation lay in the pecuniary needs of the Emperor's advisers. Subordinate to these boards were the provincial officials, in whose hands rested practically the administration of the empire.

For administration purposes the empire was divided into eighteen provinces, some of which were not inferior in size to European kingdoms. Of these, fifteen were grouped into eight vice-royalties, while the remaining three were administered by governors. Each viceroy or governor was allowed a free hand, so long as he preserved order, and forwarded with regularity the annual quota of his taxes to Peking. He raised his own land and naval forces, and was practically a king within his own rule. The central Government was content to see that he carried out the instructions laid down for his guidance, and considered the viceroy was the most successful of whom it heard least. The inevitable result was that what the treasury declined to pay the people were forced to contribute. The inhabitants of a district were thus left at the mercy of the officer who might be appointed over them. Cruel were the means often employed to extract the necessary funds from the more prosperous of the population.

The Government suffered heavily at the hands of those officials who had the management of the public moneys. Not even when the country was suffering from invasion could men be trusted to buy honestly weapons for their country's defence. Within the last few days, a prominent official in the vice-royalty of Li Hung Chang had been found guilty of purchasing obsolete weapons and useless ammunition at the price which these things were worth, and of charging the Government four times their value. If at such a time men in responsible positions could be found capable of such base treachery and sordid avarice, what must be expected when patriotism made no special appeal to them? The contrast between such actions, and the morality which the people professed, was one of the strangest features in Chinese politics. A mandarin who would extort bribes, demand illegal exactions, and lay his hands generally on what did not belong to him, hung on his walls moral maxims which were in striking contrast with his conduct. These were to them what the parables were to the American schoolboy—heavenly stories, with no earthly meaning.

An indelible disgrace on Chinese administration was the intense cruelty which was practised, not only on criminals, but on witnesses who were either unwilling or unable to give the evidence expected of them. In the judicial code, which was on the whole a humane piece of legislation, only a few of the milder forms of torture were declared to be legitimate. Instruments for squeezing the fingers and crushing the ankle bones received the sanction of the law. Horrible as these were, they were as nothing compared with the intense cruelties which were often inflicted on culprits and witnesses alike. A law which enacted that, with few exceptions, guilt must be admitted before sentence could be passed, was provocative of some of the worst horrors of the Chinese torture chamber. A few days ago, a Japanese was charged with being a spy. He denied it positively; but the Chinese mandarin probably believed him guilty; at all events, he was unable to sentence him until the man had confessed, and, therefore, he applied the torture. The man might have been perfectly innocent, yet the torture might have wrung from him a false confession.

Prof. Douglass went on to describe the different ranks of the mandarins, civil and military. They were, he said, distinguished by the button worn at the apex of the cap, by the pattern embroidered on the breast and back of the officials' robes, and by the clasp of the girdle. There were nine ranks of civil and nine of military mandarins; they wore the same buttons, but in the case of the military mandarins, instead of pacific birds on their robes, wild beasts, emblematic of the fiercer natures, formed the more appropriate ornaments. The mandarins got office by means of competitive examinations, but, as the Government found it necessary to sell positions, probably more than half of them had acquired office in this way. The existence of these examinations did not imply extensive learning. The subjects were narrowed down to the nine classics of China and the histories of the ancient dynasties. When it was said that the latest of these classics was dated the third century before Christ, and that the histories regarded only the events connected with the politics of China, it would be seen what an imperfect light they afforded for the administration of the Empire. The dicta of Confucius were full of intolerance to foreigners, and for conducting relations with foreign powers were simply ridiculous. Until the equality of our Sovereign with the Emperor of China was fully acknowledged, our relations with China would never be on a satisfactory footing. The pride and conceit of the mandarins were only equalled by their ignorance.

He hoped that the rumour of interference in the present crisis by the British Government was incorrect. The time was not ripe for European interference. The Japanese were in the full tide of victory, and would naturally and rightly treat with scant courtesy an attempt from the outside to rob them of the fruits of their victory.

When the proper time came, when China was brought to her knees, the European Powers might intervene wisely and effectively. Until then, any meddling Power would only meet with discomfiture.

The lecturer described the tedious progress of the competitive examinations, and dealt with the social manners and customs of the Chinese. There were, he said, many secret societies, political and social, and it was only by unceasing vigilance and wholesale executions that they were kept in check. One of the largest of them had for its chief aim the overthrow of the present dynasty, and the restoring to the throne of the old line of Chinese sovereigns. At the present time, these societies constituted a grave and immediate danger to the empire. The necessity of sending large bodies of troops to the front denuded these provinces of their local forces, and gave these societies an opportunity to make themselves felt. It would be well, therefore, while it was possible, for the Chinese to make peace with their enemy, before any serious outbreak took place.

Prof. Douglass spoke concerning the marriage customs of the Chinese, and the degradation of the women. There was, he concluded, a great future before China: we should see her a great and powerful empire. One of the first signs of her true regeneration would be that her women would be given the freedom and justice that were accorded to her Western sisters.

The address was illustrated by a number of lantern pictures illustrating life in China.

M A P S .

"RELIGIONS OF THE WORLD, with the stations of the London Missionary Society." Price 6d. Printed in colours. Geo. Philip and Son, London and Liverpool, 1895. This is a very interesting map, with a number of diagrams and types of men. The map contains a good deal of information in a graphic form which is sometimes rather difficult to get at readily when wanted. Other missionary stations are marked but not distinguished. The colours on the World Map are very striking and suggestive.

TWO NEW MAPS have been issued by Mr. Stanford, for the Military Intelligence Division of the War Office, which are of great interest and value. They are—1st., a "Map of Madagascar," compiled in the Intelligence Division, War Office, under the direction of Lieut.-Col. J. K. Trotter, R.A., D.A. and G., of the scale of 1 : 3,000,000 or 1 inch to about $47\frac{1}{2}$ miles. This map can be purchased at 2s. 6d. No. 1084. 2nd., a "Map of the adjoining Russian, Chinese and Japanese Possessions in Eastern Asia," compiled in the Intelligence Division, War Office. Scale, 1 inch to 65 miles. No. 1087. This is not overcrowded with names, but is clear and readable. It extends from Irkutsk to Japan.

NORTH AFRICA.—"Carte du Sahara et du Nord-Ouest de L'Afrique de la Méditerranée au Sénégal et au Lac Tchad." Dressée par P. Vuillot, Membre de la Société de Géographie de Paris. Echelle 1 : 4,000,000. This beautiful, comprehensive and valuable map has been added to the treasures of the Society by the kindness of its author. It is very beautifully executed, and is at this time of the first importance in connection with present day questions. But it is also a most useful historical document, as the travels of de Caillée (1828), Richardson (1845-60), Barth (1849-55), Pavet (1850), Dickson (1852-54), and of the later French travellers are shown upon it, and other French maps have been used in its compilation. To those who take interest in this interesting part of the world it is indispensable. It is published by Challamel, 5, Rue Jacob, Paris. Price 5 francs.

THE MALAYAN TRANS-PENINSULAR RAILWAY.

Communicated by Mr. J. HOWARD REED, Hon. Sec. (Victorians).

A GLANCE at the map will show that the Malay Peninsula, a large portion of which is either British territory or under British protection, forms a wedge of territory several hundred miles long, which effectually cuts off direct access to the Gulf of Siam and the China seas from the Bay of Bengal, except by way of the Straits of Malacca, a voyage of several days' duration. It is evident that, for passenger and mail traffic, and for the conveyance of light, valuable, or perishable merchandise, an opening here exists for a well-considered railway project. The bringing of the ports of India, Ceylon, and the West generally, into more direct and more rapid touch with Bangkok and the Southern Chinese ports, is probably in itself sufficient to promise largely for the success of any such scheme.

Any railway, in short, which at once reduces the distance between two important seaports by some nine or ten hundred miles, and at the same time opens up a district which is rich in both vegetable and mineral products, and populous withal, is on the face of it a promising commercial undertaking. Such, in brief, are the advantages of the railway which is now under construction between Senggora, or Singora, in the Gulf of Siam, and Alor-sta on the shores of the Straits of Malacca.

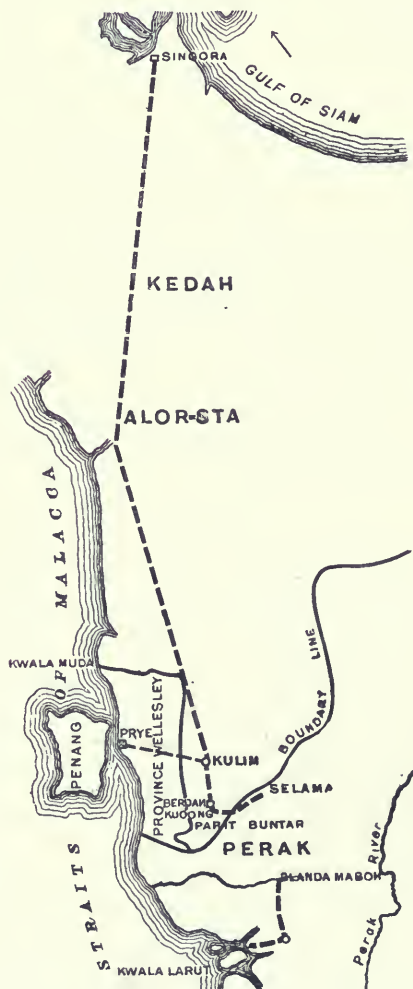
The construction of this railway is the outcome of a scheme proposed by Mr. Charles Dunlop, of Singapore, to whom a concession has been granted by His Majesty the King of Siam, in conjunction with the Sultan of Kedah and the Governor of Senggora. This is stated to be the first definite railway concession granted to a foreigner by the monarch of Siam.

His Majesty's concession grants the right for the construction of a railway through Siamese territory from Senggora, on the shores of the Gulf of Siam, across the district of Kedah to Alor-sta, a native settlement on the west coast of the peninsula, and from thence southward to Kulim—a total distance of some 140 miles. Kulim is situated some eighteen miles inland from Prye Dock on the seaboard of Province Wellesley, opposite the island of Penang.

The British authorities of Province Wellesley have not been slow to follow up the important concession granted to Mr. Dunlop. They have obtained permission from the Colonial Office for the construction of a line over the eighteen miles which separates Kulim from Prye Dock, and thus to connect the British seaport with the Senggora-Kulim line, tapping at once the whole of the productive district opened up by the new railway. The British Resident of Perak has also made arrangements for the proposed Prye-Kulim section to be continued a further sixteen miles to Selama a town situated just within the boundary of the Perak Protectorate.

Some years ago a proposal was made for the cutting of a canal through the Isthmus of Kra—north of the district now under review. This was, of course, with a view of reducing the distance from the Indian Ocean to the Gulf of Siam, and bringing the ports of Siam and Southern China into easier and more direct connection with Western ports. The scheme fell through when carefully considered.

The railway, however, which is now actually in course of construction, will to a large extent accomplish the original object, except for the fact that break of bulk will be necessary at each end of the line for all merchandise passing from sea to sea. On the other hand, the railway will be made at a very much smaller cost, will answer every purpose for the conveyance of passengers and mails, and even for heavy



By permission of the Proprietors of the "Engineer."

goods if necessary; and will at the same time tap the rich and productive inland districts, encourage local trade and industry, and do much to develop the natural resources of the peninsula.

The first section of the line under construction, that between Senggora and

Alor-sta, is stated to be through a country which presents very few engineering difficulties. The line is to follow what is practically an ancient trade route across the country. There is already a good road in existence, which may be traversed the whole distance by wheeled vehicles. This portion of the country also is well watered, and already extensively cultivated by the inhabitants, who are numerous.

Originally a large trade passed this way between Siam and India, but of late years it has been practically killed by the facilities offered by cheap steam navigation. It is believed, however, that much of this trade may be again revived by a railway, and that, in any case, the local trade is already sufficient to prove remunerative. The line will pass right through the Purlis coalfields, and the tapping of these alone is a most valuable and important consideration. The country to be opened up has been pronounced as the most fertile in the peninsula.

Kulim, to which point the king's concession allows the line to be carried, is in the very heart of the tin mining districts of the Malay peninsula. Selama, again, in the Protectorate of Perak, to which place, as before stated, it is intended to extend the line, is also in the middle of an important tin mining centre, and the British line from Kulim to Prye Dock will bring this valuable mineral down to the British port for shipment. The value of these mining districts cannot be over-estimated, and given proper railway facilities there is no saying how valuable they may not become.

The Malay Peninsula is well known as one of the most valuable and extensive tin producing countries on the face of the earth. Only recently *The Engineer* remarked: "It is not too much to assert that wherever one puts one's foot down in the Malay Peninsula there is tin underneath it. The quantity is inexhaustible, and the quality unsurpassed in any metal market either at home or abroad."

In addition to tin and coal, gold is also found in considerable quantities, and the whole country is otherwise very rich. Coffee and chinchona can doubtless be cultivated with much advantage on the higher lands, while rice can be grown in any quantities in the valleys.

The productiveness of the Malay Peninsula in all kinds of fruits, cereals, and other vegetable commodities is too well known and appreciated to need any special mention. No one can visit either Singapore or Penang without being struck with the extreme fertility of the country. As one wanders along the roads, even close to the busy settlements, this is forced upon him. Coconut palms, bread-fruit trees, all kinds of spice and nutmeg plants surround him on all sides. Great plantain and banana trees breaking down with enormous bunches of fruit, each a tolerable load for a man to carry, are everywhere to be observed; while large tree-ferns and other beautiful vegetation peculiar to the tropics appear in every scene. The wealth of smaller, but no less beautiful plants, various kinds of lovely ferns and delicate sensitive plants, interspersed with gaudy and variously coloured flowers, is a picture of exquisite loveliness which in its richness is simply bewildering. The visitor to these settlements soon, also, becomes familiar with numerous fruits which were to him previously only a name, and in many cases, probably, not even that; but these are among the commonest products of the district. Truly Malaya is a veritable Eden.

The great need of Province Wellesley, and of the island of Penang, is better accommodation for shipping. Indeed, before either of these places can hope to successfully compete with Singapore extensive improvement works will have to be carried out. The increase of trade, which is certain to follow the opening up of the interior districts by the new railway, will doubtless so stimulate the commercial life of the colony that the improvement of dock accommodation and wharfage, sufficient to cope with the larger requirements, will follow as a matter of course. Prince of Wales Island, or Penang, is only separated from the mainland by a narrow strait, of

from two to eight miles wide. It will doubtless be found possible to improve the harbour, which this strait forms, and to provide increased and more satisfactory wharfage at a reasonable cost. Experts have already been called in to consider and report upon this question.

Hitherto the bulk of the shipping trade has been carried on on the island of Penang, but with the completion of the railway it will, probably, be found more advantageous to more especially extend the accommodation on the mainland at the railway terminus.

The port of Alor-sta, which is sixty-five miles to the north of Penang, will also no doubt derive considerable benefit from the new railway, and as the construction of the line is commencing at that point it will certainly receive an immediate impetus. The bulk of the trade will, however, be sure to flow through Penang and Province Wellesley when once the line is completed.

Though the shipping accommodation at Penang is bad, that at Senggora is still worse, and may be pronounced practically *nil*. The natural conditions of that port, however, appear to be such that an excellent harbour can be made at comparatively small cost. *

Railways have been the great civilizing and developing influences of the present century. Given a population with a variety of needs and a capacity for industry, a country with natural mineral resources, a rich soil, and with such a climate and sufficiency of rainfall as will render it productive, and a railway constructed at reasonable cost is almost at once an assured success. In any case it is an influence for good in the district which it opens up, and almost in all cases tends to the improvement and development of the country through which it passes. Whether in Europe, in Canada, in Africa, or in Asia the result is the same. Barbarity and savagery give place before the advance of the steam engine; while development, progress, and commercial success follow in its trail. Railway construction and extension will doubtless tell the same tale in the future of the Malay Peninsula as it has almost invariably done elsewhere. The colonies of the Straits Settlements, and especially Penang, are to be congratulated upon the bright and encouraging prospects which are before them, largely due to the foresight, energy, and persistence of Mr. Charles Dunlop.

A Manchester Bishop in Central Africa.—A correspondent writes :—“It was in the columns of the *Manchester Guardian* that one of the earliest announcements was made of the proposed important change in the Catholic Mission of Uganda, by which a portion of that mission field was to be given up by the French ‘White Fathers’ of Cardinal Lavigerie to the English Fathers of St. Joseph’s Missionary Society of Cardinal Vaughan. The initiative did not, as might have been expected, come from the British Government, but from Bishop Livinhac, the Superior of the French Society, who came himself to London some time ago to propose such an arrangement to Cardinal Vaughan. The desirability of the change will be apparent to all. It has been the grotesque confusion in the native mind of national and religious denominations which has done so much harm and produced such fatal internecine hostilities in the past. To Mwanga and his people the ‘Wa-Fransa,’ or French, and the Catholics were identified with one another; just as the ‘Wa-Inglesa,’ or English were the same as the Protestants. To arrange that at least a part of the Catholic missionaries should be ‘Wa-Inglesa,’ speaking the English tongue and hailing from the country of Captain Lugard and Sir Gerald Portal, is surely one of the

* On this point the opinion of Mr. Henry Louis, a gentleman who has in recent years visited Senggora, is valuable. We hope to give this gentleman’s account of Senggora in an early Journal.

best ways of disabusing the native mind of this pernicious error ; and now that all Uganda is to come under the protection of the Union Jack, the new policy will be advantageous and welcome to all parties concerned. The negotiations that have been steadily progressing for some months have culminated in a decision of Propaganda—the Colonial Office (so to speak) of the Catholic Church. By this the hitherto united mission of Uganda is broken up into three 'vicariates,' entitled respectively those of the Upper Nile and North and South Nyanza. The first of these, the new English mission, occupies that part of British East Africa limited by a line drawn from the Kaffa mountains (where it adjoins the Galla or Shoa vicariate) to Lake Kioga or Koja, thence to Mount Kenia, its eastward boundary being the vicariate of 'Zomguebar,' or the coast opposite Zanzibar. The two Nyanza vicariates occupy the remainder of the territory. Although it does not appear so on the map, it is stated that the Upper Nile vicariate will include 'the capital,' which must mean Rubaga, the capital of Uganda. What adds interest to the new arrangement is that the first bishop appointed for the new English vicariate is a Manchester man. The Right Rev. Henry Hanlon, now bishop-elect of Teos, and vicar apostolic of the Upper Nile, though of Irish descent, was born in St. Edmund Street, Rochdale Road, in this city, on April 13th, 1862. His earliest education was received at St. Augustine's School, Granby Row. Subsequently the family attended St. Edmund's, Miles Platting, where Henry became a Sunday school teacher. At first he was destined for a business career, and was apprenticed to Messrs. Heaps and Harrison, of Oldham Street. Meanwhile, however, he had been much impressed by reading foreign missionary literature, especially the *Advocate*, a little quarterly periodical published by the Mill Hill Missionary Society. His aspirations were warmly seconded by the Rector of St. Edmund's, the Rev. Dr. Desplenter, who privately 'coached' the lad in Latin and Greek. His extraordinary capacity for acquiring foreign languages, afterwards developed in Central Asia, was already being shown, so that he was soon qualified to enter the 'Apostolic School,' or preparatory college for foreign missions, then established at Kelvedon, in Essex, but subsequently removed to Freshfield, between Liverpool and Southport. After completing his arts course here he proceeded to Mill Hill College for his philosophy and theology, and after a most successful career of study was ordained priest at Hammersmith Seminary on September 21, 1889. At the ninth International Congress of Orientalists, held in London in 1892, a paper of Father Hanlon's was presented containing 148 unpublished Ladaki ballads and folk-songs which he himself had taken down in Thibetan from the singing of the native musicians, with translations and notes. He has also forwarded another paper for the tenth Congress, which is to meet next month at Geneva. Besides this he has published numerous valuable articles, ethnographical and geographical, in the *Illustrated Catholic Missions* and elsewhere. No less remarkable has been his missionary zeal, evinced by several perilous journeys through the Nubia Valley and other parts of Ladak. In the winter of 1892, an epidemic of small-pox having broken out in the valleys, Father Hanlon took some lessons in vaccination from the medical man at Leh, and then set out with a few attendants and a supply of lymph for the stricken districts. In attempting the passage of one of the lofty Himalayan spurs the party was caught in a severe snowstorm, and Father Hanlon's hands were so severely frost-bitten that he had to be tied like a sack of corn across his yak and carried back helpless to Leh. It was expected that he would lose all his fingers through frost-bite, but after several months of great suffering he eventually recovered. From the frosts and snows of the Himalayas this Manchester missionary is now called to the charge of a mission whose southern boundary is the equator itself, and whose northern limit is only 6 degrees. It would be difficult to imagine a greater change, whether of climate, country, people, or language. Still the new bishop is very young, only just turned 32 years, and has abundance of energy and industry for this new field of work. His career has been such in the past as may well win him the esteem of all his Manchester fellow-townsmen of whatever creed they may be, and all Manchester men will surely look forward with interest and sympathy to the important part now to be played by one of their own number in the future civilisation of Uganda. —*Manchester Guardian*, August 1st, 1894.

* * The Bishop is a Corresponding Member of the Society.

CORRESPONDENCE.

The following letters will be of interest to the members :—

RIGHT HONOURABLE SIR GEORGE GREY, K.C.B.

7, Park Place, St. James's, S.W., 22nd August, 1894.

Dear Sir,—I have delayed replying to your letter in the hope that my health might have been so completely restored as to enable me to meet your wishes, but I am now obliged to abandon all hope of such being immediately the case, and am writing to my friends in various quarters informing them of this fact.

Will you express to your Society my thanks for the compliment which they have paid me in asking me to address them? For this I shall always feel grateful.—
Faithfully yours,
G. GREY.

Exhibits at Oxford in the Bodleian Library at the meeting of the British Association and described by Mr. H. YULE OLDHAM, M.A.

Oxford, August 15, 1894.

Dear Sir,—The geographical exhibits in the Picture Gallery yesterday were :—

Gough's Old Map of Great Britain, framed.

MS. Douce, 390 (portolano in book form).

„ Canon. Ital., 144 (portolano, by Batt. Agnese, A.D. 1536).

„ Canon. Ital., 142 (portolano, by Batt. Agnese).

„ Canon. Ital., 143 (portolano).

„ Canon. Ital., 141 (portolano).

„ Canon. Ital., 140 (portolano).

„ Bodl. Add. E. 8 (portolano on solid boards).

„ Bodl. Add. F. 9 „ „

„ Bodl. Add. E. 10 „ „

This list will, I hope, enable you at any future time to identify the particular MSS. which you have seen.—I am, very truly yours,

E. Sowerbutts, Esq.

F. MADAN, Sub-Librarian.

BARON VAN OPPENHEIM.

Berlin, W. den, Mohrenstrasse 65, September, 1894.

My Dear Sir,—I beg you to accept my best thanks for your esteemed letter, and for the reprints you kindly sent me. I am very much obliged to the Rev. S. A. Steinthal, Chairman of the Council of your honoured Society, for translating my work, and thus rendering it accessible to English readers, and especially to the members of your esteemed Society. I am at present occupied in finishing the detailed account of my journey, which I hope will appear shortly. I shall not fail to place at your disposal a copy as soon as out, and beg your Society to accept it as a small return for their kindness.—With many thanks and kind regards, believe me, dear sir, yours faithfully,
BARON VAN OPPENHEIM.

MRS. GREENWOOD.

34, Furness Road, Eastbourne, October 19th, 1894.

Dear Sir,—I need not tell you how much I appreciate the expression of sympathy conveyed to me in your letter of the 28th of September on behalf of the members of the Council of the Manchester Geographical Society, and for which I thank them most sincerely. Allow me also to thank you for your personal tribute of affection. I did not remember that you knew my husband in the old days of the Working Men's College. Dr. Greenwood had always great interest in the success of the Manchester Geographical Society.—Believe me, yours sincerely,

Eli Sowerbutts, Esq.

K. E. GREENWOOD.

THE RIGHT HONOURABLE W. E. GLADSTONE.

Hawarden Castle, Chester, 23rd October, 1894.

Dear Sir,—Mr. Gladstone wishes me to thank you for the extremely kind offer made him of the 9 Volumes Journal of the M.G.S., which he accepts with much pleasure, feeling it will be a work of great interest. Red is the colour he would choose of those you are good enough to propose.—Yours faithfully,
H. DREW.

NEW BOOKS.

"IS THE EARTH A PLANET? A Study in Physical and Mathematical Geography." By C. ROBERTSON, M.D., M.R.S.G.S. *Edinburgh*: St. Giles' Printing Company. 68pp.

"Is the Earth a Planet?" This is the title of a booklet recently issued by the St. Giles' Printing Company, Edinburgh, in which the author, Mr. C. Robertson, M.D., M.R.S.G.S., seeks to show that the earth does not revolve about the sun, as is generally supposed, but that, contrariwise, the sun revolves about the earth; or, in other words, that the Ptolemaic, and not the Copernican, theory of our system, is, after all, the correct one. The pamphlet indicates that the writer possesses some literary ability; but, on the other hand, it betrays a woeful ignorance of astronomical science, and we predict that when its author has made a little more research he will regret its issue. One of Mr. Robertson's assertions is that the earth is not small relatively to the sun, but that the sun is much the smaller of the two, or, quoting his own words respecting the sun, "its apparent and actual diameters do not materially differ, or, in plain language, the sun is just the size we see." It would be interesting to know what diameter the sun appears to Mr. Robertson, whether a yard, a mile, or a thousand miles.

Attention is directed to the divergence in the figures denoting the sun's distance and diameter as given by the ancient and modern astronomers. Let Mr. Robertson, however, ask such of his friends as, like himself, consider the sun to be "just the size we see," their opinions as to its distance and diameter, and it will surprise us greatly if their estimates agree more closely. We have further the assertion that the magnitude of the sun is a subject which has never been properly discussed by astronomers, and that the method of computing its size and distance is not given in astronomical works, but is passed over and taken for granted. It is true that we have not all, personally, had the opportunity of taking the observations from which the sun's parallax is deduced, but accepting the statements of those who have—just as we depend on others for much of our geographical knowledge—any one conversant with figures can calculate the sun's distance and diameter for himself. It is a simple problem, and we would recommend Mr. Robertson to work it out. Another grievance of the author's is the practice on the part of astronomers of referring the earth's own motions to those of the sun, and to a novice this is, perhaps, a little confusing; but it will be evident that from the apparent motion of the sun, the exact movement of the earth in space may be deduced. Mr. Robertson invites his readers to believe that the apparent motion of the sun is its real one, and that the sun makes a revolution round the earth in a year. He cannot consistently stop here, however, for as the sun is said to *rise* in the east and *set* in the west daily, it follows on the lines of his own argument that it must move round the earth in 24 hours, and this, we think, would be too awful for even Mr. Robertson to contemplate. We would advise him to reconsider the entire subject, and, meanwhile, it will be safe for us to hold to the opinion that the earth is a planet, revolving like her sister planets about their central luminary the sun.

PROCEEDINGS OF THE SOCIETY.

OCTOBER 1st to DECEMBER 31st, 1894.

The 310th Meeting of the Society was held in the Town Hall, Manchester (by permission of the Lord Mayor), on Wednesday, October 3rd, 1894.

The Right Honourable the Lord Mayor, the Right Honourable the Earl of Derby, the Rev. S. A. Steinthal (Chairman of the Council), and other members of the Council, received the members of the Society, of whom a very large number were present.

At the close of the reception, the Lord Mayor, the Earl of Derby, the Chairman, and others, retired to the Lord Mayor's rooms, whilst an exhibition of Canadian Scenery (about 100 lantern views) was given in the large hall. The slides had been selected from a large number placed at the service of the Society by the Canadian Government, the Canadian Pacific Railway, and the Grand Trunk Railway of Canada. The pictures were much appreciated. At the same time a distribution of literature relating to Canada, much of it very beautifully illustrated with engravings and maps (about 2,000 separate publications), was made to the members, who eagerly accepted them. Several large and handsome maps of Canada were also hung for reference and for examination. The pamphlets, maps, and a large and important collection of literature (now placed in the Library) had been presented to the Society by the Agent-General of Canada, the Government of Canada, and the Canadian Pacific, and Grand Trunk Railways.

After the exhibition and a little conversation, the Right Honourable the LORD MAYOR took the chair, when the Right Honourable the EARL OF DERBY addressed the Society, giving a most interesting geographical address on Canada. (See page 253.)

Professor Boyd-Dawkins, Canon Symonds, Mr. Mark Stirrup, Sir Bosdin T. Leech, and others, took part in the subsequent proceedings.

Very hearty thanks were given to the Lord Mayor for the use of the Town Hall and for his kindness in occupying the chair, and to the Earl of Derby for his valuable and interesting address, to the Government of Canada, to the Agent-General of Canada, to the Canadian Pacific, and to the Grand Trunk Railways for the use of the lantern slides, and for the handsome gifts of the maps, books, and papers.

The EARL OF DERBY responded in a hearty way, and the LORD MAYOR briefly thanked the members.

It may interest the members to mention that copies of the photographs taken at Knowsley, on the occasion of the visit of the Society, were graciously accepted by Lord Derby. They were presented by the "Victorians" through the Hon. Secretary, Mr. J. H. Reed.

The meeting closed at a late hour.

The 311th Meeting of the Society was held in the Town Hall, pursuant to a special notice, on Wednesday, October 3rd, 1894, at 7-55 p.m. The Rev. S. A. STEINTHAL in the chair.

The SECRETARY read the notice calling the meeting and explained the reason for it. It being intended to register the Society as a Literary and Scientific Society, the Council had been advised that it was necessary to revise the Rules.

The revised Rules were submitted.

To Rule 8 was added the words: "And shall not make any dividend, gift, division or bonus in money unto or between any of its members."

Mr. MARK STIRRUP proposed, and Canon SYMONDS seconded, the motion, "That the Rules as now amended be the Rules of the Society." The motion was carried without dissent.

The Rules as amended, with the certificate of registration by the Registrar, are here given for ready reference:—

I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be:—

1. To further in every way the pursuit of the science, as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with Consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.

2. To hold meetings at which papers shall be read, or lectures delivered by members or others.

3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.

4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.

5. To inquire into all questions relating to British and Foreign colonisation and emigration.

6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.

7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.

8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.

10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence), and twenty-one Councillors.

11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.

12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months from the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

IV. PAYMENTS.

18. Any ordinary member shall pay an annual subscription of £1 1s., or he may compound by one payment of £10 10s. An associate member shall pay an annual subscription of 10s. 6d. The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

ORDINARY MEETINGS.

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of proceedings shall be as follows:—

(a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.

(b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.

(c) The election of new members to be declared and the names of candidates to be read.

(d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest the Council may make provision for a larger admission of visitors.

ANNUAL MEETINGS.

30. The Annual Meeting of the members shall be held at such time and place as the Council shall determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

SPECIAL GENERAL MEETINGS.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

VI.—COUNCIL AND OFFICERS.

THE COUNCIL.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman.

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committees shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

PRESIDENT AND VICE-PRESIDENTS.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

CHAIRMAN OF THE COUNCIL.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and Officers, and to summon, when necessary, special meetings of the Council and of Committees.

TREASURER.

45. The Treasurer has the charge of all accounts ; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by two members, who shall be elected at an ordinary meeting at least one month before the Annual Meeting.

SECRETARIES.

49. The duty of the Honorary Secretaries shall be :—

- (a) To conduct the correspondence of the Society and of the Council.
- (b) To attend the meetings of the members and of the Council, and minute their proceedings.
- (c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting ; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.
- (d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

The foregoing Rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894.

(Signed)

GEORGE, *President.*

S. ALFRED STEINTHAL, *Chairman.*

F. ZIMMERN, *Honorary Secretary.*

JAS. D. WILDE, M.A., *Honorary Secretary.*

ELI SOWERBUTTS, *Secretary.*

[COPY.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895.

E. W. B.

The 312th Meeting of the Society, was held in the Library, Brown Street, on Wednesday, October 10th, 1894, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The Minutes of Meetings (295 and 311) from May 2nd to October 3rd, were read and confirmed.

A large correspondence was submitted to the Members.

The Election of the following members was announced :—

ORDINARY : Mr. A. W. Flux, M.A., Mr. A. H. Collier, M.D., Mr. H. S. Collier, M.D., Mr. J. S. Collier, M.D., The Hon. Walter Rothschild, M.P., Mr. Wm. Bradshaw, Mr. R. M. Simpson, Mr. A. J. Herbertson, Mr. H. W. Clarke, Mr. W. E. Husband, M.D., Mr. A. Y. Schofield, Mr. J. W. Spence, Mr. Wm. Barton, Mr. Wm. Ormerod, Mr. Law. Dillon, Mr. E. T. Whitelow, Councillor J. H. Greenhow, Mr. Harry Thompson.

AFFILIATED SOCIETY : The Eccles Co-operative and Provident Society.

ASSOCIATES : Mr. Percy Douglas, Mr. Peacock, Mr. C. H. Harwood, Mr. A. Taylor, Mr. R. S. Darbyshire, Mr. A. K. McAdam, Mr. Alf. Goodwin, Mr. F. J. Paton.

A very large number of presentations of maps, books, pictures, furniture, and curios having been made to the Society, they were at this meeting duly presented. Thanks to the donors had already been forwarded, and they were confirmed by the meeting. The particulars of all these presentations will be found in the "Additions to the Library," printed at the end of the Journal.

Geographical excursions of German schools were described by the Secretary, and were well discussed.

Information on the excursions of the Western Railway of France (Normandy, Brittany, and the Channel Islands) was given.

The report of a meeting held at Liverpool, on "The Hausa Language and People," was read.

Notice of the 33rd annual meeting of the Yorkshire Naturalists' Union, to be held at Doncaster, October 18th, with programme of the proceedings, was read.

The following letter to the *Times* was read :—

LIBERIA AND HER CRITICS.

BY DE WITT BROWN.

To the Editor of the "Times."

SIR,

As I am aware that no journal has so large a number of readers or so extended an influence, as well in the English speaking world as outside of it, I feel that Liberia cannot afford to be silent when she is assailed in your valuable columns ; I therefore beg you will in all fairness allow me to lay before your readers a few plain statements.

In your issue of the 22nd September, 1893, I find a letter on "The Krooboys of West Africa," by one styling himself "Old Coaster." The statements contained in this letter can be classified under two heads only : "The suppressio veri" and "the suggestio falsi." Your correspondent, doubtless aware of the slight interest taken in West African geography by Englishmen, attempts to impose upon their credulity or ignorance by his misleading statements about the Kroo country ; fortunately your readers can, by consulting any map of West Africa, ascertain for themselves that the Kroo country is situate within the Republic of Liberia, between meridians 7° and 9° west of Greenwich. The Kroo people, moreover, are not confined to the strip of coast.

named after them, but are to be found along the whole Liberian seaboard and up the various rivers. Some have opened coffee farms in various parts of the Republic, others are engaged in trade, whilst a considerable number are skilful seamen and experienced pilots. In consonance with these facts, captains of steamers do not confine their choice of "Krooboy" to one particular part of the coast, but take them, each captain according to his preference, from all parts of the Republic. "Old Coaster's" suggestion of an International Conference on the "Labour Question," as he calls it, is unparalleled for effrontery, and his reasons stand equally in bold relief for their inconsistency. If the Kroo country be "outside" the Republic and only "adjacent" to it, its labour cannot be controlled by this Government, whether impotent or not; nor need it cause anxious concern to any foreign Government. Again, how is it possible for a State, "too weak to exert its authority over its internal affairs," to "retard" and "obstruct" the flow of labour from within its limits to regions beyond? To "retard" such labour in seeking a foreign market implies superior inducement at home; to "obstruct" it, the State must be able to exert force. With England on our right hand, and France on our left, regulating in their own interests the employment of their native inhabitants as labourers in foreign colonies, it is to be reserved for Liberia to have her rights to regulate her native labour invaded by an International Conference. So much for "Old Coaster and the Krooboy of West Africa." I will now ask your indulgence to say a few words with regard to Liberia generally, more especially in view of the repeated and glaring misrepresentations of her critics.

Liberia's history agrees with Topsy's account of her origin in "Uncle Tom's Cabin"—"Never was born; never had no father, no mother, no nothin'! I 'spect I grow'd; don't think nobody ever made me."

No nation founded her; no government ever adopted her. A few American citizens, noble-minded great-souled men, commiserating the condition of the American negro and desirous to improve his lot, resolved to try the experiment of sending to Africa those who were willing to go. The United States was not long in seeing the wisdom of the project, and readily co-operated with them for a few years. For more than 40 years coloured men of the slave class were sent to this country by the American Colonization Society. Not 10 per cent could read or write; less than 5 per cent had a common school education; and the entire number who had acquired a liberal education, and had in 44 years come to this country, does not exceed a dozen. Farm hands, house servants, and mechanics composed the vast majority of those who, in 1877, voted in favour of National Independence. The first President was a blacksmith, who had received a common school education in Liberia by private instruction. The first Attorney-General and the first Chief Justice had also received a common school education in America. Such was the nation which was forced by the avarice and cupidity of certain traders to assume independence; and such were the men who, having fearlessly grappled with the American Slave Trade, doing more to suppress it than the combined navies of England and America, had the courage to undertake the responsibilities of independence.

For 46 years Liberia has had to grapple with the duties and obligations of self-government. Foreign demands have been made upon her, and she has been held to the same obligations, the same demand of diplomacy as the more enlightened nations with centuries of national experience.

If she lacked information, or was unskilled in matters of State-craft, it was her misfortune, and she suffered the consequence. No nation in dealing with her makes any allowance for her antecedents, her want of familiarity with governmental procedures, her lack of culture, training, and political experience. If her legislation has been crude, her juridical knowledge imperfect, or her diplomacy lame, she has

been ridiculed. No official (as a friendly apologist) has said, "The greatest wonder is that Liberia has done so well" From slavery to freedom, and from freedom to sovereignty, are mighty strides! The ignorant sophisticated bondsman of yesterday assuming to-day the duties of diplomatist, legislator, jurist, and yet no nation fair enough to say, "Well done."

The captains of steamers in the West African trade have for years been guilty of the most flagrant and wanton violation of our laws. When we have complained we have been told to "enforce" our laws; and for the sake of maintaining peaceful relations with the governments concerned, we have refrained from taking active steps against them. Harris, an Englishman, opened business at Sulymah, when we owned those territories, refused to pay duties, incited the natives against us, and finally succeeded in arousing English cupidity, with the result that we lost those territories.

The same course was attempted at Half Cavalla by Lawrence, an Englishman, who supplied arms and ammunition to those whom he encouraged to rebellion against us, but fortunately, with a different result. On the 10th of November last Half Cavalla capitulated, Lawrence and his schooner *Beatrice* had been seized, and this illicit trade (under the respectable name of British Interests) has to seek a new covert for itself.

France, on the other hand, also desirous of a slice of our territories, has taken possession of that portion lying to the south-east, between the Cavalla and San Pedro rivers. Such is the treatment accorded to us by the most enlightened nations of the world, who vaunt their honesty and fairplay as the brightest jewels in their civilization.

With regard to the favourite taunt of our malevolent critics, our weakness and impotency, I take the liberty of quoting a statement which occurs in the paper read before the Liverpool Chamber of Commerce by Mr. Hesketh I. Bell, Senior Assistant-Treasurer of the Gold Coast Colony, on 1st May, 1893: "Prior to 1873 the great power of Ashanti had imposed its authority all over the Gold Coast, almost up to the very gates of the European forts and factories, and the kings and chiefs of Fantiland especially were merely the slavish vassals of the powerful ruler at Koomassie. The English had held the Gold Coast with a strong hand since 1750, and in 1821 it became a protectorate of the British Crown. For 51 years had Ashanti proved a terror to this British possession and a menace to the Government itself, which culminated in 1872, when the Ashantis actually invaded the protectorate and ravaged the whole of the Fanti country. This is unparalleled in the history of Liberia."

Another witness to the weakness of a strong Government is Sir Gilbert Carter, Governor of Lagos, who stated before the same Chamber of Commerce only six weeks later than Mr. Hesketh I. Bell with reference to the Jebus, a tribe living between the British settlement and the Yoruba country, that "Diplomatic relations with such a people could hardly be of a satisfactory nature, and as a matter of fact, unless it suited their convenience, they have seldom paid any heed to the friendly remonstrances from the Lagos Government. In such matters progress must necessarily be slow; and it must not be forgotten that until my own visit no Governor of Lagos had ever been permitted to enter Abeokuta."

I would suggest to our critics to be more careful how they throw stones.

Trade! Trade! Trade! is the cry of England. The hungry wolves of trade cry, "Let peoples perish, governments be overthrown, Africa be destroyed, and all that is good and noble in the earth. Let Christianity and civilization pass away; but let not trade suffer, languish, or decay. Such was the burden of the speeches at the banquet of Governor Carter by the Liverpool Chamber of Commerce. But all of this sordid and selfish talk was relieved by a single expression from the lips of

Mr. McArthur who on proposing the health of Sir Gilbert Carter, said, 'in the country administered by the Royal Niger Company,' the administration appears to be occupied exclusively by its trading concerns, and nothing whatever is being done to elevate the natives, our true mission in Africa."

If English governors, English merchants, at home, captains of English steamers, and English adventurers on the coast could realize that England's true mission in Africa is to "elevate and civilize the natives," Liberia would be rid of her greatest trouble, and with a bright future before her, could work out, untrammelled, her destiny. Critics like "Old Coaster" would then

"Go down to the vile dust from whence they sprung
Unwept, unhonoured, and unsung."

Christian Liberia would then indeed prove an open door to heathen Africa.

(Signed) DE WITT BROWN.

Liberia College, Monrovia, 1st Dec., 1893.

A paper on "Dardistan in 1886," by Dr. G. W. Leitner, was read by the Secretary.
A paper on

ANIMAL LIFE OBSERVED DURING A VOYAGE TO ANTARCTIC SEAS.

BY W. S. BRUCE, Naturalist to the s.s. "Balæna."

THE following is simply a brief abstract of the Journal I kept during a voyage to the Antarctic regions last year. It does not in any way profess to contain anything of a very original nature, and is not a description of the genera and species of the animals met with and obtained during the voyage, the greater number of which will be described by Professor D'Arcy Thompson at a later date. I am especially indebted to Mr. W. G. Burn Murdoch, who has given me the free use of his valuable notes and sketches.

The seals and cetaceans were our sole mammalian representatives. I shall first deal with the seals, which have been of such special interest of late.

We met with only four species of seals, all of them being true seals, and belonging to the genus *Stenorhynchus* (Allen). The Sea Elephant seal was not seen, nor were any of the Otariidæ. The four were—the Sea Leopard (*Stenorhynchus leptonyx*), Weddell's False Sea Leopard (*Stenorhynchus Weddellii*), a creamy white seal with a darker dorsal stripe, the so-called Crab-Eating Seal or White Antarctic Seal (*Stenorhynchus carcinophaga*), and Ross's Large-Eyed Seal (*Stenorhynchus Rossii*). Besides these there was another, which I think was certainly a younger form of the Sea Leopard, the apparent greater sleekness of coat, less prominence of ligamentous and fibrous structures leading me to this conclusion, as well as the condition of the uteri of those females that I examined; they, I believe, had never borne young, and were not in pregnant condition.

Ross's seal is in form and size very like the Creamy White Seal (*Stenorhynchus carcinophaga*), but its coat is somewhat sleeker, of a beautiful pale mottled grey colour, darker on the back and lighter on the belly, and varying in intensity in different individuals. They were usually associated with the Creamy White Seals on the pack, and I found many to be with young. As descriptions of all these seals occur in Richardson and Gray's Catalogue of the specimens in the British Museum and else-

where, and as specimens may be seen in the British Museum, in the College of Surgeons' Museum, in the Edinburgh Museum of Science and Art, and in the Dundee Museum, I need not delay by describing them, more than by saying that the longest Sea Leopard that was measured attained a length of over 13 feet. Also, that a rather striking, and not altogether inappropriate name was given to them by the sailors, who called them serpents, for they truly often presented a very serpent-like appearance. Dr. Donald also noted that the females of the larger species were larger than the males; but beyond this there was no obvious sexual differentiation.

In December all the seals were in bad condition, thinly blubbered, and grievously scarred, and it is noteworthy that the females appeared to be as freely scarred as the males. During January their condition improved, and by February they were heavily blubbered and free of scars. The males were apparently as numerous as the females, but I made no definite statistics. Loving the sun, they lie on the pack all day digesting their meal of the previous night, which had consisted of fish or small crustaceans, or both; the penguin is also occasionally the victim of the Sea Leopard, and I have found stones in their stomachs. These stones are likely part of the geological collection which the penguins are accustomed to carry about with them. Nematode worms were almost invariably present in the stomachs.

By February the embryo is well developed, gestation probably beginning in December. It is extremely to be regretted that it was during this time that an indiscriminate slaughter took place, as almost every female, towards the end of January and in February, is with young. In no individual did I find more than one embryo.

All the seals were obtained from the pack ice, in bluest and clearest water, the Sea Leopard being on the outermost streams, and was most frequently found singly, but sometimes in pairs or threes on one piece of ice. Of Weddell's False Sea Leopards, we on board the "Balena" only saw about four altogether, and these singly; Dr. Donald, however, met with greater numbers. Two were quite young, and one of these we attempted to bring on board alive but failed.

The Creamy White Seals, the so-called Crab-Eating Seals, and the Mottled Grey Seals (Ross's Seal), were in greatest abundance; these lay four, five, or even ten on a single piece of pack ice; the greatest number I saw on one piece of ice at a time was forty-seven. On one occasion we found some seals on a tilted berg, and so high was the ledge above the level of the water that our men clambered up with difficulty and secured their prey. This illustrates their great power of jumping out of the water. I have seen them rising eight or ten feet above the sea, and cover distances of fully twenty feet in length.

The mode of progression of true seals is well known, but although on *terra firma* man can easily outrun them, yet on the pack they glide onward while their pursuer sinks deeply into the snow.

The present generation had never seen man, and at his approach they did not attempt to flee, but surveyed him open-mouthed and fearful, during which process they were laid low with club or bullet. Sometimes they are so lazy with sleep that I have seen a man dig them in the ribs with the muzzle of his gun, and, wondering what was disturbing their slumbers, they raised their head, only too quickly to fall pierced with a bullet. Seldom did they escape—one bullet meant one seal. On the last day of sealing we were among a great host of the large Sea Leopards, and as we were returning to the ship they were moaning loudly. This was said to be a sign that they were about to start on a long journey, but was it not rather a sigh of relief when they saw their slaughterers' craft run up her bunting, and announce to all that she was a full ship, and that her thirst for blood was quenched?

While we continue to require sacks, while we persist in wearing patent leather shoes, and while we satisfy our fancies with certain purses and card-cases, the slaughter of these seals will continue. But I would here publicly protest against the indiscriminate massacre which takes place in order to supply blubber, as well as hides, for the purposes indicated. Old and young, females with young, are slaughtered alike, and should this continue, these seals, like the Antarctic Fur Seals at the beginning of the century, will undoubtedly be exterminated.

Of cetaceans we saw an immense number. We constantly met with great schools of dolphins and porpoises, as well as, on several occasions, with whales, but I must confess that I found identification very difficult. At Port Stanley I secured a ground porpoise, the skeleton of which is now in University College Museum, Dundee, and Mr. Burn Murdoch has kindly lent me some drawings which he made on the spot, to show you this evening. It was a curious fact that in almost every case the schools of dolphins and porpoises were going, more or less, in the direction of the vessel, and one wonders if there were any particular reason for this. Was it migration? Were those we met with in October and November migrating southward at the approach of the northern winter, and were those we met with south of the line in November and December moving southward with the southern summer? Similarly, were those we met with in southern latitudes in March and April fleeing from the southern winter, and those that passed us in April and May going northward with the approach of the northern summer?

Whilst in the ice we met with three kinds of whales—Finners (probably *Physalis Australis*),¹ others strongly resembling the Pacific Hunchback Whale, and Bottle-nose Whale, two of which were captured by the Norwegian vessel. Besides these, there were present in considerable numbers, grampus or sword-fish (*Orca*), conspicuous by its long dorsal fin. Ross says that in Erebus and Terror Gulf, on New Year's Day, 1843, within one mile of the position we held on Christmas Eve, 1892 (viz., in 64° S. 55° 28' W.), "Great numbers of the largest sized black whales were lying upon the water in all directions: their enormous breadth quite astonished us." Elsewhere, also, he talks of a whale "greatly resembling, but said to be distinct from, the Greenland Whale."² It was chiefly upon the authority of these two statements, in addition to some others made by Ross, that the Dundee and Norwegian whaling fleet ventured to the south last year. None of the vessels saw any sign of a whale in the least resembling the Greenland or Bowhead Whale (*Balena mysticetus*), although they were in the ice for a period extending over two months. Are we to conclude that Ross was mistaken, or has made a misleading statement? I think not. All we can say is that we failed to confirm Ross's statement, and that, on further search, the whale greatly resembling the Greenland whale may yet be found. We shall see whether the plucky little Norwegian craft that is pushing to 78° S., in the region of Victoria Land, has better luck this season.

Ross says that the whales he saw were "lying" on the water, and this is one great characteristic of *Balena mysticetus*. Contrary to the habits of the finner whales in the north, on more than one occasion we saw the southern finners also lying on the water, and sometimes the dorsal fin seemed to have been almost entirely torn away, perhaps by the ice. Could Ross have been thus deceived? Surely not, when he had had thirteen years' experience in Arctic Seas! Besides, he also adds, "their enormous breadth quite astonished us." This is a second great characteristic. The Bowhead Whale has a great, broad, flat back, with a head one-third the total length of its body. These finners had a bony vertebral ridge, and very much smaller heads. Nor can we

¹ Called "Blue Whales" by Captain Larsen of s.s. "Jasen."

² "Ross's Voyage," vol. i., 169.

believe that Ross wished to mislead us, for in every way we found him a most faithful guide.

On the 16th of December, when we first made ice, we passed through thousands of finner whales. Many came quite close to the ship, and, as far as the eye could reach in all directions, one could see the curved backs and hear the resounding blasts. *Euphasia* swarmed in the water. Many blue petrels and myriads of Cape pigeons were flying around and settling in the water.

On the 26th of January, while out in a boat, I saw what at first appeared to be a rolling piece of ice, but what was in reality a white finner whale.

The whale which I have said strongly resembled the Pacific Hunchback Whale (*Megaptera versabilis*), I have seen going "tail up," a characteristic of the Bowhead Whale. It has a broader and flatter back than the finner whale mentioned, but can scarcely be said to resemble *Balaena mysticetus*.

* * This Paper was printed in Vol. XII of the Proceedings of the Royal Physical Society of Edinburgh.

The following Communication from the Madras "Catholic Watchman" "On the Ghona Lake" was sent by the Rev. L. C. Casartelli, Ph.D., and was read :—

THE GHONA LAKE.

FOR some time past the Ghona Lake has been the object of public attention. The village of Ghona is situated among the hills of Garhwall, a native State, whose boundaries extend to Mussoorie and Landour. On the 22nd September, 1893, a landslip occurred, and a hill 4,000 feet above Ghona slipped bodily down into the bed of the Birai Ganga River, but fortunately it did not settle itself down upon the village of Ghona. In October, 1893, another landslip took place, which finished the work of effectually blocking up the valley of the Birai Ganga, thus forming a huge lake, whose dam was 900 feet high, 3,000 feet long, 2,000 feet thick at the top, and 11,000 feet thick at the bottom. From calculations made by Mr. H. Holland, of the Geological Survey Department, he came to the conclusion that "the weakest section of the dam was at least 23 times the necessary strength." Nevertheless, the waters of the Birai Ganga slowly but surely undermined the seemingly insuperable obstruction, and rushed down the valley along their triumphant course. Fortunately we learn of no human lives being lost, the precautions taken by the Government have met with much success. It must have been a time of great excitement when the dam was pushed aside, and the angry waters went rushing down the valley. It makes us feel romantic that in our time Nature has performed one of her prodigious freaks—the formation of a huge lake and the scattering of its waters all within the twelvemonth.

The catastrophe happened last Saturday (Aug. 25, 1894) at 8 p.m., when the dam was visibly giving way. At midnight the flood rose to 30 feet at Chaumali, between Srinagar and Ghona, and in an hour's time it reached the height of 160 feet. Next morning it was telegraphed from Ghona that the lake had almost gone. At Hurdwar, which is 158 miles from Ghona, the flood began at 10 a.m., running at eight miles an hour, the river rising eight feet, bringing down dead animals and building materials. Much praise is due to the bravery of the telegraph official at Ghona, who would not leave his post till the last. Mr. Holland's description of the lake and its surroundings in March last is very picturesque :—"The lake view from the dam is the crowning charm of scenery typically Himalayan and wild. The steep mountain slopes, partially clad with fir, evergreen oak, and gorgeously-flowered rhododendron, slope steeply down on either side to the blue-green waters of the lake, whilst to the east

Tirsul, and two associated peaks, rising over 20,000 feet, with snow-clad slopes and glaciers, form the background of the picture." The Ghona Lake is now a thing of the past, but it will long hold an important place in the traditions of the simple inhabitants of the villages that dot the slopes of the Himalayan range.

Some notes on the *Ecolè Libre des Sciences Politiques* and the Syllabus for 1894 were read.

Several of the papers gave rise to lively discussion.

The Monday evening lectures at Owen's College, and those of the new lecturer in geography, Mr. A. J. Herbertson, were announced.

A large map of the Suez Canal had been finished by Mr. J. Howard Reed, and was put up for inspection. Thanks were tendered to Mr. Reed for his work.

The death of the Rev. H. Gibson, of New Zealand, was reported. It was resolved that a note of sympathy and condolence be sent by the Secretary to his widow.

The 313th Meeting of the Society was held in the Library on Wednesday, October 24th, 1894, at 7-30 p.m. In the chair, the Rev. S. A. STEINTHAL.

The minutes of the last meeting were read and confirmed.

A number of letters were read.

Books and maps which had been presented were exhibited.

The election of the following members was announced :—

LIFE : Mr. John Ainsworth, Machakos.

ORDINARY : Mr. J. H. Pickup and Mr. Charles Brier.

ASSOCIATE : Miss L. E. Churchill.

The discontinuance of "*L'Afrique, Explorée et Civilisée*" in consequence of the illness of M. Faure, of Geneva, was announced by the Secretary.

It was resolved that the Secretary be requested to write to M. Faure expressing the regret of the Society at his illness and the consequent stoppage of the publication.*

Mr. J. Howard Reed read the following holiday paper on "Tenby," which gave rise to several questions and some discussion :—

NOTES ON TENBY.

By Mr. J. HOWARD REED, Honorary Secretary of the "Victorians."

WHAT Llandudno is to North Wales, such, in many respects, may Tenby be considered to be to the southern portion of the Principality. Like the popular northern watering-place, the gem of South Wales is built upon a rocky promontory, which, jutting out more or less abruptly from the mainland, is surrounded on three sides by the open sea. While, however, Llandudno is built in a hollow between the two main features of the Orme's Head, and is thus situated at a comparatively low elevation, Tenby proudly stands on the headland itself, some eighty or one hundred feet above the sea.

* This Journal was a comprehensive resumé every month of all matters relating to Africa, and was edited by M. Faure, a Genevan scholar, with great skill and impartiality. It will be a great loss to be deprived of the publication.—ED.

At the end of the promontory is situated the Castle Hill, upon which remnants of the old Flemish castle still exist, but only in a ruinous and broken condition. A portion of the tower and scattered portions of the walls are now all that remains in evidence of what must once, from its situation, have been a formidable fortress. The tower is now used, by the Coast-guard authorities, as the base for a large flagstaff. Its summit can still be reached by means of the decayed steps within.

The grassy slopes of the Castle Hill, from which lovely views of the sea may be obtained, are laid out with gravelled walks and plentifully supplied with seats. There visitors may stroll or sit while listening to the band, enjoy delicious and bracing sea-breezes, and feast their eyes upon the lovely surrounding views. The Castle Hill is also the site of a small local museum, and of an imposing statue of the Prince Consort—the Welsh national memorial of “Albert the Good.”

A few hundred yards further seaward, but separated by the sea from the Castle Hill, except at very low tide, is St. Catherine's Rock. This huge rock, which stands out above the water, probably one hundred feet high, is quite inaccessible except by the rude steps which have been in most part carved out of itself. Its top is crowned by a frowning defensive fort, in which are mounted several heavy guns of modern type.

At the foot of the Castle Hill, on the land side, is situated the lowest-lying portion of the town, and at this place (on the left as we leave the hill) is the only approach to the south sands for vehicles or horses. On the right is the small wharf, alongside which an occasional steamer is berthed, and the tiny harbour in which gather the numerous fishing boats as they return laden with their cargoes of freshly-caught fish.

From this point the town rises sharply along both sides of the promontory, the north and south sea fronts forming roughly two sides of a hollow-sided triangle, that to the north being more deeply curved than the other. Along both sea fronts are built commodious dwellings, with here and there hotels. All the front windows, and many of the back ones also, of these buildings command extensive sea views. From those on the north or north-east one can, on a clear day, follow the coast-line, round Carmarthen Bay and a portion of Glamorganshire, from the immediate district of Tenby to the distant Worm's-head; while from the southern aspect much of the same coast-line can be seen, with the addition of the picturesque slopes of Caldy Island, and, at times, not only the far away island of Lundy, standing sharply defined on the horizon, but the still more distant shores of Devonshire.

The roads fronting the town, on both sides, run along the very edge of the cliffs, which, in the less precipitous places, are cultivated as hanging gardens and shrubberies. Steps and steep inclines are here and there arranged, by means of which the sands and rocks below are reached.

Large portions of the old defensive walls of the town (like the castle of Flemish origin) still stand, some of the main streets passing through them by way of massive archways. These old grey walls, with their various turrets, bastions, and arches, rendered in places more picturesque by being closely overgrown with a mantle of ivy, or naturally decorated with lichens, mosses, grasses, and harts-tongue ferns, are a favourite study for artists and photographers. The Church, which of course stands within the town-walls, is a fine structure dating from the 12th century. It is of various styles of architecture, and of great historic interest.

The modern Tenby has extended itself considerably beyond its old-time limits, and the venerable walls are now practically in the heart of the town. Part of this later portion takes the form of a fine esplanade, with a lengthy row of well-built mansions, of four or five stories high, and mostly let out in flats and suites to visitors. The view from the windows of these dwellings is extensive and unique, but that from

the roadway itself, on the edge of the cliff, is scarcely less extensive or charming. Seats are arranged at intervals along the esplanade, and steps are here and there cut out from, or built among, the rocks of the cliff to admit of access to the sands below.

The sands themselves are not to be surpassed. They are firm and regular for walking, and are a positive happy hunting ground for children with spades and buckets. The rocks jut out from the cliffs in an irregular manner, forming here and there little bays or coves, and the cliffs themselves have been eaten under by the waves, until caves of varying extent have been formed. The rocks, where worn smooth by the constant ebbing and flowing of the tides, form convenient (though certainly hard) seats and lounges for the elder folks, afford considerable scope for the climbing propensities of younger people, and together with the caves make hide and seek for children a perfect delight. The pools left among the rocks by the receding tide supply the youthful naturalist, who may search them, with numerous aquarium specimens in the shape of small crabs, shrimps, anemones, &c., while limpets, winkles, and tiny mussels may be found clinging to the rocks themselves.

The gradual and regular slope of the Tenby sands renders bathing exceptionally safe and pleasant. Considerable numbers of bathing vans are in use, but are certainly much more useful than ornamental. At most modern sea-side resorts the demon advertising agent has been at work, and even our quiet, little South Wales watering-place has not succeeded in escaping his attentions. To see a bathing van at Tenby is to be annoyingly informed, in large letters, that "Beecham's pills are worth a guinea a box."

Although so well provided with bathing apparatus, many people prefer to make use of the shelter of the rocks for dressing and undressing purposes, while others come straight from their bedrooms in dressing-gowns or macintoshes and take their dip, returning home to complete their toilet.

Tenby is not only a delightful summer resort, but is also much frequented during the winter months, especially by people of delicate physique. Owing to peculiar physical and geological conditions its climate is remarkable for its equability. In summer it is somewhat colder than Torquay, owing to its more northern situation, while in winter, owing probably to the influence of the Gulf Stream, it is several degrees warmer. The climate in summer is that of Northern Europe, while in winter it resembles that of Southern France or of Italy. While the range of temperature between winter and summer at Cambridge is equal to no less than 70°, that of Pembrokeshire is only 44°. There is also a much smaller range, between the average night and day temperature, than is the case at most other places. The prevailing winds blow from the south-west, fogs are almost unknown, while snow and frost are rarely experienced. Although the total rainfall is found to be about equal to that of the whole country, the rain mostly descends at night, the days being remarkable for clear, blue skies. All-day drizzling rains, it is said, are almost unknown.

Tenby is a splendid centre for the archaeologist, the county of Pembroke being very rich in old castles, churches, village preaching crosses, and other monuments. Among the former may be specially mentioned: Manorbier, Carew, and Pembroke Castles, the latter being renowned as the birthplace of King Henry VII., and for the fact that it was successfully besieged by Cromwell during the Great Revolution. Among the ancient churches attention may be drawn to those of Cheriton—the burial-place of the Earls of Cawdor—Penally, Gumfreston, Carew, St. Florence, and several others, all of exceptional interest, and within more or less easy reach of Tenby.

The Cathedral of St. David's is not so easily reached, but the modern pilgrim to the shrine of the Welsh patron saint is not likely to be disappointed. The journey from the nearest railway station, Haverfordwest (easily reached from Tenby), to the

"dead city" is one of "sixteen miles and sixteen hills," but the pilgrim can always flatter himself that two pilgrimages to St. David's are considered to equal one to Rome. The average visitor who reaches there will be astonished at the extraordinarily large proportions of the ancient pile, and, after gazing upon the tombs of the Duke of Richmond, father of Henry VII.; of Giraldus, the Welsh historian; Bishop Gower, the ruin of whose fine palace stands close to the cathedral itself; besides many other objects of intense interest, will not regret the time and pains spent in visiting the sacred edifice, hallowed as it is, not only by the hand of time, but by innumerable sacred associations.

Lydstep caverns, only to be entered and explored at low water during spring tides, and Hoyle's Mouth, a great inland natural cavern, from whence have been extracted the remains (now in the Tenby Museum) of various savage brutes which roamed the district in primeval times, are of much interest to those who care for exploring weird and uncanny places. A visit to the Stack Rocks, the breeding-place of myriads of sea-birds, is an event which the tourist should take care not to miss. The vast assemblage of sea-fowl is indeed a sight to behold! On such an excursion Stackpool Court, the seat of Lord Cawdor, may be visited, and the visitor is not likely soon to forget the lovely woods through which he will pass, nor the beautiful ferns, of many varieties, which he will behold.

As a hunting ground for the ornithologist, the entomologist, the botanist, and the conchologist the district of Tenby is unique, and an enthusiastic collector in any of these branches will certainly not be disappointed.

If the tourist wishes for Belle Vue by the sea, let him go to Douglas or Blackpool; but if he requires to reach a land of quiet, of beauty, of delightful scenery, of blue seas and azure skies, then by all means let him turn his steps to Tenby—the loveliest spot in "Little England beyond Wales."

The Rev. L. C. Casartelli, M.A., Ph.D., Rector of St. Bede's, communicated an interesting paper on the return of Baron Dhanis from Central Africa after defeating the large Arab slave gangs at Nyangwe.

The reading of the paper caused a lively discussion, and it was resolved "That the hearty thanks of the Society be sent to Baron Dhanis through the Royal Geographical Society of Brussels for his persistent defence of the native populations, and congratulations on his safe return."

Professor Guido Cora sent a paper on the "Voyages of Hall, Nares, Greely, and Peary," with a beautiful and valuable map to illustrate these Arctic Voyages. The paper was read, and aroused much interest.

Mr. E. G. Ravenstein, F.R.G.S., sent a paper on "Meteorological Observations in British East Africa in 1893," a portion of which was read.

PART OF A REPORT ON METEOROLOGICAL OBSERVATIONS IN BRITISH EAST AFRICA FOR 1893,

By E. G. RAVENSTEIN, F.R.Met.Soc.

METEOROLOGICAL observations have been taken by the Officers of the Imperial British East Africa ever since 1891. The earlier records appear to have been lost, and it is therefore, fortunate that Mr. C. H. Craufurd, an official of the Company, should at least have abstracted from them the amount of rain which fell.

The meteorological records, of which a summary is presented in this report, refer to the following stations, viz. :—

Chuyu, Mombasa, Malindi, Magarini, Lamu, Witu, and Kisimayu, on or near the coast; Machako's and Fort Smith in Kikuyu in the interior. At all these stations the temperature, rainfall, and other climatological factors have been recorded, and in the case of five of them the records embrace at least one year.

Observations of the rainfall only were recorded at the following stations, viz., Ikuthu, Jilore, Mbungu, and Takaungu.

I have added to the above an abstract of the very careful observations made by Sergeant W. Ballance, R.E., in 1891, at Witu, and at two places near Mombasa.

The Tables giving the rainfall and the number of rainy days extend to all observations up to date, as far as they have been accessible to me. They embrace the information collected by Mr. Craufurd, as also the results of observations made at East African stations outside the British "Sphere."

Finally, there is a "Summary Table," giving the leading climatological facts for twenty-three stations in East Africa, as also for Cape Town, Greenwich, Vienna and Rome, to serve as standards of comparison.

Unfortunately, I know nothing of the corrections to be applied to the instruments used at the stations, the observations of which I have summarised. The results, therefore, are given as they appear in the registers sent home. I have, however, reduced the barometrical readings to 32° F. and corrected them for gravity. There is reason to believe that some of the results are seriously affected by instrumental errors.

The formation of "means" presented some difficulty, owing to the unsuitable hours selected for observation. The mean temperatures have been deduced from $\frac{1}{2}$ (max. + min.) in the case of Mombasa and Malindi, the results being slightly in excess of the truth; from $\frac{1}{4}$ (7, 2, 9, 9) in the case of Witu, which yields a good mean; and from $\frac{1}{2}$ (7.30 + 1), $\frac{1}{2}$ (7.30 + noon), $\frac{1}{2}$ (9 + 9) or $\frac{1}{2}$ (7.30 + 4) in the case of the other stations. Along the coast the means obtained in this manner are probably not more than 1° F. in excess of the truth, but in the case of inland stations, to judge from a series of hourly observations made at Kakoma, the error would be far in excess of this. At Kakoma a mean temperature deduced from $\frac{1}{2}$ (max + min.) seems to exceed the truth during the wet season to the extent of 0°·6 F., and during the dry season to the extent of nearly 2° F. In the case of means deduced from $\frac{1}{2}$ (7.30 + noon) the correction to be applied would seem to amount to—1·2° F. for the dry season, and to +1·3° F. for the rainy season, whilst means deduced from $\frac{1}{2}$ (7.30 + 1) require a correction of respectively —1·7° and +2·4°.

The mean relative humidity has been deduced, as a rule, from $\frac{1}{2}$ (7.30 + 10), and the result, for the year, but not for separate months, would seem to be correct within 1 per cent for all coast stations.

I now proceed to offer a few remarks on the general climatological features of British East Africa as they present themselves in the light of the records received.

THE COAST REGION.

The observations are as yet far too scanty and imperfect to enable us to deduce from them true means of the temperature, and still less of the rainfall and humidity. This should be borne in mind when reading the following remarks :—

TEMPERATURE.—The mean annual temperature varies from 78° (Chuyu Magarini) to 82° (Mombasa). The coolest month (June, July, or August) has a mean temperature of from 74° to 76°, the hottest (February or March) of from 81·5° to 86° (at

Kisimayu). The lowest temperature recorded during 1893 was 63° (Lamu, in June), the highest 94° (Magarini, in December).

The annual range, which is the difference between the means of the coolest and hottest months, amounts, at Mombasa, to only 5·8° F., which is the same as at Zanzibar, whilst at Kisimayu it probably exceeds 10° F. This range, it need hardly be stated, is exceedingly small as compared with what is experienced in Europe.

The daily range, which at Zanzibar amounts to 7·8, reaches 7·7° F. at Mombasa and 13° at Magarini. The extreme months at Zanzibar are April (7° F.) and September (8·9° F.). At Mombasa they are November (5·3° F.) and August (9·6° F.); at Magarini, June (9·0), and December (16·2°), the greater range at Magarini being due, no doubt, to its situation at some distance from the coast and on the slope of a hill. Hygienically this small daily range may be looked upon as a favourable feature of the climate of Eastern Africa.

The relative humidity at Mombasa, Malindi, and Witu amounts to 81 per cent. At Lamu it is probably higher. The atmosphere is driest immediately before or shortly after the commencement of the heavy rains, say in March; dampest in the month having the heaviest rainfall, namely, April or May.

RAINFALL.—The rains, as in other tropical countries, follow the sun, commencing soon after the sun has passed the zenith. There are thus two rainy seasons in the year, viz., the “greater rains” (Mazika), which culminate in April or May; and the “lesser rains” (Mvuli), which last from October to November or December. “After rains” in July, so anxiously looked for by agriculturalists in Zanzibar and in Uganda, do not appear to occur in the coast region under review.

There are no months in British East Africa in the course of which an occasional shower may not be expected, but January and February, and sometimes September and October, are practically rainless months at Mombasa and all along the coast.

The amount of rain varies exceedingly from year to year. At Zanzibar, where the average is 64ins., the annual amount has been found to vary from 46ins. (in 1874) to 167ins. (in 1859), and there seems some justification for the opinion that the rainfall has become less with increasing cultivation.

At Mombasa the average rainfall during about ten years amounted to 51 ins., varying between 26ins. in 1892 and 91ins. in 1877, and that this heavy rain placed on record is no exaggeration, due to errors of observation, is proved by the fact that an independent observer at the neighbouring missionary station of Ribe, the Rev. Thos. Wakefield, measured 90ins. in the same year.

Even more marked is the difference in the amount of rain for the same month in different years. Thus May yielded from 4·5 to 16·6 ins.; February from 0·02 to 3·17 ins.; July (an important month for the planter) from 1·68 to 9·45 ins.

This uncertainty in the amount of rain would seem to call for works of irrigation or the formation of water reservoirs, which could regulate the supply and meet deficiencies in exceptionally dry seasons.

Observations have not as yet been continued for a sufficient number of years to enable us to form true means, but accepting 51ins. as the mean for Mombasa, and making use of all synchronous observations, I am inclined to believe that the mean annual rainfall at stations in Africa will be found to be as follows:—

| | |
|-------------------------|------------|
| Mombasa | 51 inches. |
| Malindi and Jilori..... | 45 „ |
| Magarini | 35 „ |
| Lamu..... | 37 „ |
| Kisimayu | 11 „ |

The rainfall appears thus to decrease very rapidly as we proceed northward along the coast.

The frequency of the rainfall is as important a feature from an agricultural point of view as the amount which falls. The number of rainy days varies quite as much from year to year as does the quantity; at Mombasa, for instance, it ranges from 72 to 164 days.

The quantity which has fallen on particular days has occasionally been excessive, and must have proved a great trial to the agriculturist. Here are a few instances of heavy rains within 24 hours:—

| | |
|------|--------------|
| 3·57 | ins. at Lamu |
| 3·55 | „ Mombasa |
| 3·51 | „ Chuyu |
| 2·85 | „ Malindi |
| 2·50 | „ Magarini |

All these heavy falls were registered in the April of 1893, a year the rains of which far exceeded the average.

Observations of the wind were made at Chuyu, Malindi, and Witu. Local circumstances undoubtedly influence the direction of the wind, as does also the hour of the day, but, broadly speaking, it may be stated that southerly or south-westerly winds prevail from March or April to September or October, whilst easterly or north-easterly winds are supreme during the remainder of the year.

THE INTERIOR.

In a country the mountains of which pierce the region of perennial snow, it would be easy to find stations the mean temperature of which would be the same as that of any town in Europe. But as mean temperature is not the only, nor the most important factor which distinguishes a tropical climate from the climate of our temperate regions, it would be rash to conclude from this that these upland stations would be suitable for European "colonists." No elevation above the sea level is capable of obliterating those distinguishing features of a tropical climate—a small annual range and a great daily range of temperature—whose influence upon the well-being of Europeans cannot be underrated. At Machako's, which seems in many respects the most favoured station occupied by the Company, the mean temperature is only 65°; the extremes recorded vary between 48° and 81°. Their range, however, would have been much more considerable had maximum and minimum thermometers been available. At Fort Smith, in Kikuyu, the mean temperature is still less, whilst the range is nearly the same. At all these stations the daily range seems to approach if it does not exceed 20° F., which is nearly double of what is experienced at Greenwich.

I estimate the mean annual rainfall as follows:—

Mbungu 28ins.; Machako's 47ins.; Fort Smith (Kikuyu) 43ins.

With the report are a series of detailed tables. The report was made to the I. B. E. A. Company and is published by Mr. Ravenstein, by the authority of the Company.

Dr. Black sent some notes on "Meteorology at the Cape," which were read.

METEOROLOGY AT THE CAPE.

If the Town Council had but appointed a weather prophet when the Mayor prophesied rain at the change of the moon a few months ago, the citizens would not

suffer the torture of uncertainty with regard to the weather which they at present experience.

The drought has extended far beyond the normal period, a fact which is brought home to purchasers of vegetables in a very unpleasant manner, and according to some, the end is not likely to be yet.

Not for many years past have the south-east winds prevailed to such an extent as has been the case this year, and as long as this condition obtains, it is futile to hope for the usual autumn rains.

It seems a matter for regret that the Town Council did not seize the opportunity presented by the parlous condition of the public water supply, and appoint someone who would be able to speak with something like authority upon meteorological affairs.

It was the Mayor's promise that the change of moon would bring rain, which made the Water Works Committee hesitate to purchase water from the Suburban Company at a time when the town was suffering severely from a greatly diminished water supply.

If the town possessed an accredited weather prophet the Council might be enabled to enter into a contingent contract with the water company and make better terms than those which were possible, when Cape Town had to go cap-in-hand, so to say, to the company a few months ago.

And just imagine for a moment the value of the services such a prophet might render individual citizens.

There are in Cape Town and Green and Sea Point hundreds of gentlemen who take a pride in amateur gardening.

Relying upon the usual autumn showers all these amateur gardeners have, during the past month or two, been engaged in preparing the soil and putting in plants and seeds.

And now they wait for the rain which cometh not.

It is to be feared that not a little disappointment and loss will be experienced by those who, in implicit reliance upon April and May rains, planted and sowed in the usual course.

If there were someone at the Town House able to speak with authority upon such matters all this heart-burning might be avoided.—*Extract from the "Cape Times," May 16th, 1894.*

FORECASTING WEATHER AT THE CAPE.

THE weather prophet who foretold a dry winter must have been astonished at the quantity of rain which has fallen during the past few days.

The rainfall during June on Table Mountain was most satisfactory as the following figures, furnished by Mr. J. Alf. Ellis, of the result of a visit to the rain-gauges on the 1st inst. will show: Maclear's Beacon, 7 inches; St. Michael's, 14 inches; Kasteel and Disa, 11 inches each.

The whole of the mountain top is saturated, the streams are full, and on every slope innumerable rivulets are to be found.

The rainfall on the mountain during the month compares most favourably with that during June, 1893.

The rainfall in Cape Town was 4.05 inches, against 3.80 in June last, and at Sea Point 3.76 inches.

The weather-wise who believe that a change of weather is often concurrent with a change of the moon's phases prognosticate a spell of sunshine for the next few days.—*Extract from the "Cape Times," July 4th, 1894.*

A paper on "Corea," by the Rev. W. E. Soothill, of China, was read.

The Delegate of this Society (a duty very kindly undertaken by the Rev. L. C. Casartelli, M.A., Ph.D.) to the Tenth International Oriental Congress sent his report upon the proceedings. He had already sent copies of the daily proceedings from Geneva, which are placed in the library.

TENTH INTERNATIONAL ORIENTALIST CONGRESS AT GENEVA.

To the Council of the Manchester Geographical Society.

Geneva, September 4th, 1894.

MY LORDS, LADIES, AND GENTLEMEN,—As I had the pleasure of mailing to the Society copies of all the official publications of the Tenth International Congress of Orientalists, at which I had the honour of assisting as your delegate, consisting of the list of officers and members, presidential addresses, daily bulletins of the work of each section, and other matter, it will not be necessary for me to go into details of the proceedings. I may, however, refer in a general manner to the great success of the Geneva Congress, whether in point of numbers or of the eminence of those Orientalists who actually attended and took part in its proceedings. Indeed, I doubt if ever before so illustrious a body of savants, many of whom are the masters of their respective branches of learning, has assembled together at any Congress. The excellent arrangements of the local committee, and the generous and lavish hospitality of the Republic and Canton of Geneva, of the Municipality of Geneva, and of numerous private citizens of the City of Geneva, deserve a word of passing reference.

As in the London Congress of 1892 there was also at that of Geneva a special section for Geography and Ethnography, under the presidency of Prof. Vambéry; but though rejoicing in the public recognition thus paid to the importance and dignity of our science, I must confess that personally I am not convinced of the utility or desirability of such a separate section, which seems to occasion some cross-division and confusion, inasmuch as all the sections are by their nature, more or less geographical in division (*e.g.*, I. India, II. Semitic, III. Musulman, IV. Egypt and Africa, V. The Far East, VI. Greece and the East). Thus many papers of strictly geographical interest were read in each of these various sections. I now proceed to select from the report of papers read or presented those which appear to me to be of most interest to geographical science.

SECTION I.—INDIA.

M. Emile Sénart presented facsimiles of several new inscriptions lately discovered near Peshawar by Major Dean, some in a hitherto unknown alphabet.

Mr. Cecil Bendall read a paper on some inscriptions lately discovered in Behar, by Dr. L. C. Waddell.

Mr. Bhownaggee presented, in the name of the Maharajah of Bhownagar, a volume containing the Sanskrit and Prakrit inscriptions existing in His Highness's dominion and published under his auspices.

SECTION III.—MUSSULMAN.

Prof. Grünert (Prague) gave an account of E. Glaser's latest journey through the interior of Arabia and of the treasures, consisting of inscriptions and MSS., brought back by him to Europe; of the latter fourteen date from the fourth to the sixth centuries of the Hegira, and are thus among the most ancient Arabic MSS. known.

SECTION IV.—EGYPT AND AFRICA.

This section was particularly engaged in discussing the proposed dam of the Nile, which threatens to destroy the island of Philæ, with all its archaeological treasures. The section drew up a memorial, afterwards adopted by the entire Congress, petitioning that some alternative scheme might be adopted and Philæ and its invaluable monuments be spared.

M. de Morgan, director of the Service of Antiquities in Egypt, described in full the numerous excavations carried out by him in Egypt, particularly those at Dahchour, also those at Ombos.

Sig. Schiaporelli: "On the Geography of Nubia and the Countries to the south of Egypt."

M. Naville (President of the Congress) gave a detailed account of his explorations last year at Deir el Bahari.

SECTION V.—FAR EAST.

M. Chevalier: "Ceremonies of the 15th day of the 1st month in Corea. (At night the Corean erects an altar in his garden facing the moon, traces on bamboos the characters signifying gold, wood, water, earth, casts these thrice behind him, and then consults the work 'Yue loents'e' to find out what will happen during the year. The president, Prof. Schlegel, remarked that these ceremonies have the greatest resemblance to those in use in China.)"

M. Chavames presented rubbings of an inscription in six languages found at Kiu-yong-Koan, north of Pekin; some of these (Tibetan, Uigur, &c.) were identified. Prof. Land: "On Javanese Music."

Dr. Waddell: "The Motive of the Mystery Play of Tibet." (He opines that it is an adaptation or modification of a pre-Buddhistic pagan ceremony, involving human sacrifice and perhaps cannibalism. The human victim is now replaced by a paste mannikin, and Buddhist tenets are supposed to be indicated by the play.)

Dr. Radloff gave an account of his expedition to Mongolia in 1891, south of Lake Baikal, on the shores of the Orkhon River. (Discovered monuments or inscriptions belonging to four epochs, viz., I. Prehistoric, II. Ton-Kine dynasty, III. Uigurs, IV. Sinico-Mongolian, near Erdens-jon Monastery. Klementz has since continued these discoveries. The inscriptions have been deciphered and explained. They show that the regions between the Yenissei and the Orkhon were inhabited by a Turkic race.)

Dr. Huth: "On Tibet and Mongolian inscriptions, discovered in 1891 by Dr. Radloff, at Tshagan Baishang."

Prof. Schlegel (president): "The Social Position of Women in China." (This paper attracted a large audience. It gave a very favourable account of woman's position in China. "The bourgeoisie woman in China is almost as happy as her equal in Europe.")

M. Henri Cordier: "On the Share taken by the Swiss in Studies relating to the Far East." (Paid a tribute of praise to the Missionary Society of Bâle, to the Swiss travellers de Courten, Aimé Humbert, Henri Moser, A. de Claparède, to the eminent

Geneva Sinologue, M. François Turretini. "Between 1552 and 1779 we find among the Jesuit missionaries five Swiss, the most celebrated being Jean Terrenz, 1576—1630; among contemporaries we must quote Père Dechevrens, born at Chêne in 1845, who organised the Observatory of Zikawei.")

The two following papers were not read owing to want of time, but were laid upon the table and taken as read :

Rev. H. Hanlon, late of Leh, Ladak : "The Marriage Customs and Songs of Ladak."

Rev. J. Prenger, Inobong, North Borneo : "The Dusuns of Borneo and their Riddles."

SECTION VI.—GREECE AND THE EAST.

M. Reinach : "A Forgotten People, the Matienes." (Mentioned by Herodotus and other Greek writers, from the Halys to the Zagros. M. Reinach believes them to be the authors of the Monuments of Boghaz Khein and Eyjouk, usually attributed to the Hittites.)

SECTION VII.—GEOGRAPHY AND ETHNOGRAPHY.

M. Ch. Maunoir : "Life and Works of Dutreuil de Rhins," a French explorer, recently assassinated whilst travelling from Tibet to China. (It is hoped that his papers have been saved; the Chinese government has promised to do all it can to find them and remit them to the survivor of the expedition, M. Renard.)

M. Chachanow : "Foreign Influences upon the Civilisation of Georgia."

M. Henri Moser : "The Irrigation of Central Asia."

Dr. Benloew : "Names of places ending in *-anda* near Trebizond." (The termination is Albanian.)

Same author : "The Nationality of Trojans."

Prince Wiasemsky : "Meteorological Observations made during a journey on horseback across Asia, from Mongolia to Tonkin, from Siam to Russian Turkestan, thence to Persia and the Caucasus." 2. "The Origin and Process of the use of Tea among various Asiatic Peoples."

M. de Chaparède (President of the Geographical Society, Geneva) gave an account of the culture and qualities of tea in Japan.

M. Megavorian : "Traces of Marriage by Purchase and by Abduction among the Modern Armenians."

Mr. V. Rosthorn : "Frontier Tribes of Eastern Tibet." (Much new matter about the Shans.)

M. Henri Cordier exhibited photographs of two plates of a Korean-Chinese Atlas belonging to the British Museum. The Atlas contains thirteen maps and is at least a century and a half old.

Dr. Benloew : "The Language and Origin of the Causasian Peoples."

I may add that the rooms of the Geneva Geographical Society (one of our corresponding societies) were thrown open during the Congress to all members of the latter, and were adorned with the splendid collection of Japanese prints and drawings, 3668 in number, belonging to M. Turretini, and formerly the property of Humbert, who used them in compiling his great work on Japan. The collection was of the greatest interest and value.

In conclusion, I may add that, at the invitation of the French Government, the Congress selected as the next place of meeting (for 1897) Paris. An invitation to the United States of America was therefore postponed.—Your obedient servant,

L. C. CASARTELLI.

A letter which appeared in the *Manchester Guardian* on Wednesday, October 24, 1894, on the Japanese-Chinese war from Mrs. Bishop, from Moukden, was read by the Secretary.

THE HOLY CITY OF THE MANCHUS.

GRAPHIC DESCRIPTION OF CHINESE "PLUNDERING AND BLUNDERING."

MOUKDEN, MANCHURIA, SEPTEMBER 1.

Six weeks ago I arrived in this great Imperial city, with its population of 400,000, its crowds of officials, and its "Boards," corresponding, with one exception, to those of Peking, marking it out as the second city of the empire. I spent a week in a junk in coming up from Jintze, not on the river but on a vast inundation, mostly 8 ft. deep, the result of five days of phenomenal rain, which has submerged the magnificent crops for which the alluvial plains of Manchuria are famous, and threatens to bring about a winter of destitution, with its Chinese concomitant—organised brigandage. I saw the destruction of over thirty villages and the wreck of a most remarkable agricultural prosperity.

Manchuria has been friendly to foreigners, who receive no worse appellation than "honourable devil"—a perfectly polite designation! Scotch missionaries have been established here for twenty-two years, and are on the most friendly terms with the people, and remarkably so with the mandarins and many of the highest officials, who show them tokens of friendship, publicly and privately, on all possible occasions. Dr. Christie, the medical missionary, is the trusted friend, as well as medical adviser, of many of the leading officials and their wives; and altogether the relations between the foreigners and the Chinese are unique. No foreign lady had previously traversed the inner city on foot; but I did so on several occasions without attracting any curiosity or crowd, and even when I took a tripod camera, and the people did collect about me, they were perfectly friendly and good-natured.

After the declaration of war on the 1st of August Manchu troops began to march southwards from Kirin and other northern cities, passing through Moukden on their way to Corea; for it is evident that Japan has such command of the sea that troops from all parts of China bound for the war must march through this province. Chinese and Manchu troops have been passing through Moukden for three weeks at the rate of 1,000 daily, as many as 9,000 arriving here on one day of last week. On their way from the north the Manchus have distinguished themselves in the villages by seizing property, riotously occupying inns without payment, beating innkeepers, and wrecking Christian chapels, not from anti-Christian but anti-foreign feeling. This anti-foreign feeling culminated at Liao-yang, forty miles from Moukden, a fortnight ago, when Manchu soldiers, after wrecking the Christian chapel, beat Mr. Wylie, a Scotch missionary, to death, and attacked the chief magistrate for his friendliness to foreigners.

An anti-foreign feeling has rapidly arisen in Moukden. The servants of foreigners and the hospital assistants are insulted in the town, and on my last visit to it, instead of the usual friendliness, I found myself the centre of a scowling and distinctly hostile crowd. The wildest rumours regarding foreigners are spread and believed, and the question of the actual safety of the three foreign families here is seriously and anxiously occupying the attention of the authorities. In the meantime they have been requested to give up their usual journeys into the interior, and to avoid going into the streets or outside the walls. The "street chapels" have also been closed, as

the native Christians are very apprehensive for their own safety, being regarded as "one with the foreigners," who, unfortunately, are generally supposed to be "the same as the Japanese." I have been obliged to give up a journey I proposed to take to the Amur down the Sungari, as no road traversed by soldiers is safe. Along these roads, and especially on that from Moukden to Liao-yang, as I learn from those who have recently travelled them, the aspects are most dismal. Not a cart or animal is to be seen; the great inns are closed or have their shutters smashed; and the villages and farms are deserted. All tracks converging on Moukden are thronged with troops, not marching, but straggling along anyhow, many carrying crimson banners, but few armed with modern weapons. I have seen regiments of quite passable physique among which there was not a rifle! Some were armed with gingalls; others with muzzle-loading muskets, very rusty and of a most antique pattern; some with very long matchlocks; many with spears and long knives; some with bayonets attached to red poles! Some of the picked men of the Moukden garrison who left under General Tso soon after war was declared were armed with modern rifles. I have been informed by three trustworthy persons that they have seen large numbers of men marching to Corea armed with bows and arrows only! The dress is easy, but unfit for hard wear, and very stagey. The best uniform is a short loose red cloak bound with black, loose trousers, and long boots of black cotton cloth, with thick soles of quilted rag, which are useless in wet weather.

Recruiting is very active. The able-bodied beggars and unemployed coolies of the city have been enlisted, and are being sent off after three weeks' drill. All the mule-carts in the city and neighbourhood have been seized for transport, which means a suspension of about half the trade of this prosperous city. Soldiers' pay is considerably higher than that of labourers, and it is only since the Chinese defeat and great slaughter of the 5th of August that there has been any unwillingness to enter the ranks. Now the troops march out of Moukden saying they are going to be shot; and if they chance to see a foreigner make such remarks as "This is one of the 'devils' for whom we are going to be shot!" and when a large party of them, in attempting to make a forcible entry into the Governor General's palace a few days ago, were threatened by the guard with being shot, the reply was, "We're going to be shot in Corea; we may as well be shot here." Many say that it is a farce to march them out at the "Gate of Victory" when they are going to defeat. The Chinese troops, though their drill and discipline are very loose, would doubtless, as General Gordon said, be splendid soldiers if well led; but the Manchus (or Tartars) are a shambling, disorderly, insubordinate rabble, dreaded by the Chinese citizens, presuming on their Imperial relationship, and little better than licensed brigands. Between them and the Chinese regiments there are hatred and jealousy, which will be among the difficulties of the war.

The cavalry under the Mahometan general Tso, about 5,000 men, are in a state of strict discipline and admirably drilled, besides being fairly well armed. They are mounted on active, well-built ponies, about 13½ hands high, up to great weight. They were among the first troops to leave the city, and were soon entangled in the quagmire, which extends for more than 100 miles. On the first day their commander beheaded six for seizing melons without payment, and on the second fourteen had their heads taken off for attempted desertion. To Western notions the arrangements are "higgledy piggledy"—in fact, there are few arrangements at all. The commissariat is both inefficient and grossly dishonest. No depôts of provisions and fodder have been formed in advance, and tens of thousands of men are tramping to Corea in the vague expectation that they will be able to seize on any food there. Since March the Japanese have been buying and storing every picul of rice and grain.

that the Koreans could spare. In a recent journey of nearly three months in the interior nothing impressed me more than the scarcity of food and the hand-to-mouth way in which the people live; and as to fodder, there were few villages, and those at great distances apart, where I could feed my modest cavalcade of four ponies. There are no medical arrangements and no ambulance corps, Chinese custom being to strip their wounded and leave them. They have firearms of all makes, and the varying cartridges are huddled together without any attempt at classification. The conduct of a war with a well-equipped enemy under these circumstances involves an amount of needless suffering and a prodigal waste of life which one shrinks from thinking of; but China may beat in the long run in spite of all.

Telegrams are received here constantly from the army, and official courtesy almost daily sends us some news, which, when unfavourable to China, is doubtless more or less correct. A private telegram from an officer in high command has just been communicated by the recipient, and is translated thus: "Condition deplorable; no food; fever and dysentery; men deserting; eating our horses." This is from the neighbourhood of Ping Yang.

The excitement in Moukden and the anti-foreign feeling are daily increasing, and the high officials are alarmed even for their own positions, as they are left with very few reliable soldiers. Some of them regard the deep dissatisfaction which prevails, even in Manchuria, with the present dynasty as the greatest of China's perils at this time. An Imperial proclamation in the interests of the safety of foreigners has just arrived from Peking, which it is hoped may allay somewhat the prevailing excitement; but Manchuria, from its proximity to the seat of war, can hardly be expected to be calm, especially as it is likely to suffer more than any of the provinces of China.

The Rev. S. A. STEINTHAL, F.R.G.S., F.L.Inst., Chairman of the Council, opened a discussion on the question of China, Korea, and Japan.

The discussion was illustrated with a large number of maps, specimens of pottery, ivory carvings, and a large number of lantern views.

Messrs. J. Howard Reed, A. J. Herbertson (Lecturer in Geography at Owens College), C. H. Bellamy, the Secretary, and others took part in the discussion.

The ground covered included the geography, history, political situation, the probable results of the present struggle, the inter-relations of China, Japan, and Korea, and the previous action of other nations upon the countries named; the arts—Korean, Chinese, and Japanese; the agriculture and industries, the waterways and roads, the local administration and Imperial methods of rule, the money, and the importance of the opening up of these countries for the good of the people and the use of the natural riches for the world; the history and development of missionary activity, and the probable hostility which might be expected from the Chinese at the close of the war. All these and other points were touched upon in the discussion, which was of a most interesting character.

Mr. HERBERTSON exhibited the Berlin Geographical Society's Historical Atlas, calling attention particularly to the maps illustrating early ideas in relation to the far East.

The SECRETARY called attention and exhibited (from the Library) the valuable and interesting reports of the Smithsonian Institute, containing accounts of the Ainos of Japan, which are illustrated with a multitude of pictures, &c.

The Secretary read from the recently received "Bulletin of the Marseilles Geographical Society" an account of the recent death of M. Paul Armand, with the addresses on his life and work.

It was resolved that the Secretary be requested to convey to the Marseilles Society the very great regret of this Society at the death of its Secretary, and the desire of this Society to join in condolence and sympathy upon the sad occasion.

In consequence of the removal of the Library to St. Mary's Parsonage, the papers on the programme for the rest of the quarter, including Mr. Warren's on "Polar Exploration," were postponed to future dates.

The Delegate read his report of the British Association Meeting at Oxford.

REPORT OF THE DELEGATE TO THE OXFORD MEETING OF THE BRITISH ASSOCIATION IN 1894.

THE meeting at Oxford was not very largely attended, but it was one of great enjoyment.

The city of Oxford is one of the most interesting in the kingdom.

In walking through the narrow and tortuous streets, the early history of the sumptuous buildings, their adaptation, and the erection of newer ones to present day purposes, the rise of so many great causes in religious and civil history are continually forced upon the attention. Somewhat curious are the first impressions of a stranger—colleges and halls, called new, though very old, and the generally dilapidated look of churches and buildings, owing to the use of a soft friable stone, are striking.

Anyone visiting Oxford for the first time finds the greatest astonishment and delight when turning out of a narrow and perhaps dingy street, passing under a low doorway, he discovers a beautiful square court yard, with fine buildings, and probably through another narrow passage across the Square is seen a further expanse with large trees, and an exquisite carpet of closely cut and well-rolled grass plots, edged and surrounded with brilliant flowers.

The churches, chapels, and halls of the various colleges are most interesting, and contain art treasures, monuments of great beauty, painted glass windows, splendid wood carving, busts of eminent men, portraits of the most distinguished people who have played a great part in the history of the country, art needlework, old art jostled by the new, old pictures, which seem to be of little value to an outsider, but which are invaluable from their intrinsic worth, or from the associations connected with them.

At one college Shelley is immortalized, at another DeQuincy; one is celebrated as being the birthplace of Methodism, and others as the places where new movements in science and theology had their beginnings.

There is a great wealth of possibility in learning in the great Bodleian Library, the Ashmolean, Indian, and the new museums, and especially the splendid Pitt River's collection, whilst in addition almost every college has its own museum and library.

The Taylorian Buildings, the Clarendon Press, and the Union bring us down to modern times; the remains of the old Tower, and the square massive tower—of Saxon or Norman age—of St. Michael's Church send us back to the earliest.

It is not surprising that the Oxford man forms a deep love and reverence for the beautiful city, and it would be a shame if it were otherwise.

In this city in commodious rooms the meeting was held, certain sections meeting at the New Museum. The great meetings and lectures were held in the Sheldonian Theatre.

Receptions were held at the Museum by the President, supported by Dons in all academic robes, Doctors being particularly conspicuous in their red gowns. To a Lan-

cashire man it was a curious and picturesque sight. Two meetings of the delegates were held, where discussion on the work of the various sections and the help to be obtained from the members of the societies represented by the delegates in the various experiments and investigations submitted were discussed.

Excursions were somewhat interfered with by the weather, but a number of members who took their own way had pleasant times.

Snap-shot cameras were met with at every corner, and if the old buildings had any sense of humour they must have smiled to see the eager amateurs practising their new machines on their old faces.

In section E the papers were not particularly interesting, as was evident by the small attendance; and some of the readers of papers who began with fair audiences finished with very small ones. Several papers were read in this section which had most likely been written for some other department. It held no meeting on Saturday.

The method of selecting papers to be read, and the reasons given for the rejection of others, are most mysterious and perplexing, and at times suggest something approaching unfairness. There is room for amendment in the way the business of the meeting is conducted in some of the sections, and if no alteration is made there will some day be unpleasant discussion. But after all, no one goes to the meeting for science. Everything said there must have been threshed out elsewhere, but the kindly greeting from year to year of those who are engaged in somewhat dry scientific research, counts for a good deal, and very fitly accomplishes the design and end of the meeting.

The address of the President was a noteworthy and courageous performance, and the lecture at short notice by Dr. Gregory on East Africa was magnificently done. It will be long remembered by those who had the good fortune to hear it. The meeting's grants to special committees were generous, and will bear fruit.

The following will interest the members of this Society:—

The application of Photography to the elucidation of Meteorological Phenomena.

Observation of Earth Tremors.

The Erratic Blocks of England, Wales, and Ireland.

Collection of Geological Photographs (a fine collection has already been secured).

The Exploration of the Calhole Cave, Skipton.

Zoology, Botany, and Geology of the Irish Sea.

Zoology and Botany of the West India Islands.

Climatology of Tropical Africa.

Exploration of Hadramaut, Arabia.

The Organisation of an Ethnographical Survey of the United Kingdom.

The Lake Village of Glastonbury.

Anthropometric Measurements in Schools.

*Comparing and reducing Magnetic Observations.

*The Teaching of Natural Science in Elementary Schools.

*The Erosion by Sea Coasts in England and Wales.

*The Volcanic Phenomena of Vesuvius.

*Observations on the Migration of Birds at Lighthouses.

And other subjects interesting to members of this section. Those marked * have no grant.

The Council amongst other resolutions passed one to the effect "that full support (of the Association) be given to the efforts being made to induce the Govern-

ment to send out a fully equipped expedition for the exploration of the Antarctic and Southern Seas."

The various reports, papers, and guide books issued in connection with the meeting have been placed in the Library, and will be of interest to the members of the Society.

Very hearty thanks were accorded to the writers and readers of the papers, to the Delegates, and to the Chairman for introducing the question of the evening.

The meeting closed at a late hour.

The 314th Meeting of the Society was held in the Memorial Hall on Friday, November 16th, 1894, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

Lieut-Col. C. M. WATSON PASHA, R.E., C.M.G., addressed the Society on "The Work of the Palestine Exploration Fund." The address was illustrated with fine maps, published by the Palestine Exploration Fund, by pictures, and by a fine collection of lantern slides, and was listened to by a large number of the members with great interest.

Very hearty thanks were tendered to Col. Watson for his address.

Col. WATSON repeated the address as a Victorian lecture, at the Oldham Free Library, to a crowded and interested audience on Saturday evening, November 17th.

The 315th Meeting of the Society was held in the Cotton Waste Exchange on Wednesday, December 5th, 1894, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

Mr. F. W. W. HOWELL, F.R.G.S., addressed the Society on his travels in Iceland, illustrating the address with Icelandic curiosities, silver work and wood carving, and with a very fine collection of lantern views, taken by himself in Iceland.

The address, which was very well received, gave rise to some questions and discussion, and hearty thanks were tendered to Mr. Howell for the instructive and interesting address; added to which a hope was expressed that Mr. Howell would be able to make a further series of explorations on the glaciers of that interesting Island.

The Ninth Annual Meeting of the Society was held on Monday, December 10th, 1894, at 7-30 p.m. The Rev. S. A. STEINTHAL F.R.G.S., &c., in the chair.

The notice convening the meeting was read.

The minutes of the last annual meeting were read and approved.

The Secretary's report to the Council, and Balance Sheet, with the Auditor's certificate for the year 1893, were presented.

The report of the Victorians and a report by Mr. H. T. Crook on the Ordnance Survey Committee were taken as read, and the report of the examination in Geography by the Examiners was also taken as read. (See p. 124.)

The CHAIRMAN reviewed the history of Geographical work for the year, and dealt particularly with the valuable work done by this Society, as evidenced in the various reports submitted; he moved the adoption of the reports and balance sheet, which was seconded by Mr. J. SIMPSON, and carried.

Very hearty thanks were tendered to the Council and Officers for their past services.

Chevalier R. FROELICH moved, and Mr. M. STIRRUP, F.G.S., seconded, that the following ladies and gentlemen be the Council and Officers of the Society until the end of the year 1895 :—

PRESIDENT.—His Royal Highness the Duke of York, K.G.

VICE-PRESIDENTS.—His Eminence Cardinal Vaughan, His Grace the Duke of Devonshire, K.G., the Right Hon. the Earl of Derby, G.C.B., the Right Hon. the Lord Egerton of Tatton, the Right Rev. the Lord Bishop of Manchester, the Right Hon. the Lord Mayor of Manchester, His Worship the Mayor of Oldham, His Worship the Mayor of Salford, the Vice-Chancellor of the Victoria University and Principal of Owens College, the Rt. Rev. Monsignor Gadd, V.G., the Rt. Hon. Sir James Fergusson, Bart., C.I.E., M.P., the Rt. Hon. A. J. Balfour, M.P., the Rt. Hon. Jacob Bright, M.P., Sir W. H. Houldsworth, Bart., M.P., Sir Humphrey F. de Trafford, Bart., Sir Frank Forbes Adam, C.I.E. (President of the Manchester Chamber of Commerce), Sir Joseph C. Lee, J.P., Alderman Sir Bosdin T. Leech, J.P., Alderman Sir Joseph Leigh, M.P., Mr. Benjamin Armitage, J.P. (Chomlea), Mr. Gilbert Beith, M.P., Professor W. Boyd Dawkins, M.A., F.R.S., Alderman J. Duckworth, J.P., Mr. J. Thewlis Johnson, Mr. Henry Lee, J.P., Mr. William Mather, M.P., Mr. Samuel Ogden, J.P., Mr. H. J. Roby, M.P., Mr. C. Schwann, M.P., Rev. S. A. Steinthal, F.R.G.S., F.I.Inst. (Chairman of the Council), Mr. T. R. Wilkinson (Vice-Consul for the Ottoman Empire).

TRUSTEES.—Mr. Alderman C. Makinson, J.P., Mr. Sydney L. Keymer, F.R.G.S., Mr. James Parlane, J.P. (Consul for Paraguay).

HON. TREASURER.—Mr. S. Oppenheim (Vice-Consul for Austria-Hungary).

HONORARY SECRETARIES.—Mr. F. Zimmern and Mr. J. D. Wilde, M.A.

COUNCIL.—Mr. J. E. Balmer, Mr. G. T. Bowes, Mr. Frederic Burton, The Very Rev. L. C. Casartelli, M.A., Ph.D. (Rector, St. Bede's College), Professor T. H. Core, M.A. (Owens College), Mr. H. T. Crook, C.E., Miss E. Day (Girls' High School), Mr. Thomas Dentith, The Chevalier Robert Froehlich, (Italian Consul), Mr. Hilton Greaves, D.L., J.P., Mr. J. E. King, M.A. (High Master Manchester Grammar School), Mr. Joseph Hall, M.A. (Head Master Hulme Grammar School), Lady Bosdin T. Leech, Mr. George Lord, J.P., Mr. R. C. Phillips, Mr. J. Howard Reed, Mr. Fritz Reiss, M. Leon Gerome Le Roux (Vice-Consul for France), Councillor Wm. Sherratt, J.P., Mr. Mark Stirrup, F.G.S., F.I.Inst. (Hon. Sec. Manchester Geological Society, Vice-President of the Council), Mr. W. Angelo Waddington.

HONORARY AUDITORS.—Mr. William Aldred, F.C.A., Mr. Theodore Gregory, F.C.A.

HON. SEC. TO THE "VICTORIANS."—Mr. J. Howard Reed, 56, Ducie Grove, Manchester.

A hearty vote of thanks to the Chairman for his great services to the Society and for presiding, to which he responded, closed the meeting.

The 316th Meeting of the Society was held at the Cotton Waste Exchange, on Wednesday, December 12th, 1894, at 8 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

This meeting, which was of a social character, had been intended to be held in the Society's new house, but owing to various delays the rooms were not all ready. As many rooms as were completed were open for the inspection of the members, and an informal reception was held in the Library, after which the members adjourned to the Cotton Waste Exchange.

The large hall had been decorated for the occasion, a very pretty stage being erected at one end of the room. For this stage with all the elaborate decoration thereof the Society was indebted to Messrs. Kendal, Milne and Co.

The Misses Platt, Miss Horsley, Messrs. J. Holme Moss, T. P. Cooper, A. R. Scott, and Mr. Paul Harrison gave a very choice musical entertainment.

The CHAIRMAN took the opportunity of the change in the Society's habitat for reviewing the story of the first ten years of the society, mentioning early members and friends, and the work of the society in various directions, appealing to the members to add from amongst their friends very largely to the membership.

Other members of the Council also addressed the meeting.

Mr. J. D. WILDE, M.A., one of the Honorary Secretaries, addressed the members on "Classic Dancing," showing the evolution of terpsichore from the measured, slow, religious processions of early times, and developed by the requirements of the Greek Drama. The forms and drapery were illustrated from pictures, statuary, and descriptions scattered in classic poetry.

Miss Carie Moore very kindly interpreted the illustrations by showing the figures, and giving specimens of Greek dancing in Greek costume.

After an interval, Mr. WILDE referred to the Spanish and Romany Tribal Dances, giving explanations as to rhythm, form and costume, and Miss Carie Moore also illustrated them, the Spanish Tambo dance being much admired.

The addresses and illustrations were received with great appreciation.

Refreshments of a simple character were offered in another room, after which further music was given.

Very hearty thanks were tendered to Miss Moore, Mr. Wilde, and the artists who had given the members an evening of great enjoyment.

At 10 o'clock a smoking concert was held for an hour; several members took part in it. The songs and speeches were very much enjoyed.

The 317th, 318th, and 319th Meetings of the Society took place in the New Library of the Society, December 22nd, 26th, and 28th.

They took the form of lectures to the children of the members. The weather was so very cold that there was only a small attendance. But the meetings were thoroughly enjoyed by those present, especially by the young people. The lecturers were Mr. J. D. WILDE and the SECRETARY, and the subjects discussed were "The Round World," "Volcanoes," and "Water Sculpture," illustrated with maps, pictures, photographic slides and other appliances.

320th Meeting of the Society was held in the large room of the Cotton Waste Exchange, where a large number of the members' children under twelve years of age had responded to the invitation of the Victorians.

This annual gathering is looked forward to by a number of the children with great eagerness. Besides lantern views with short geographical descriptions, numerous slides which needed no description, legerdemain feats by Mr. Irlam, some plays dances and romps for the very small people, a cake had been sent by Major Casati, which was duly cut and sampled by all who were present. It was difficult to get the young people to understand that bedtime had come, but, after passing very hearty thanks to all who had helped, they slowly retired. The meeting was very well enjoyed both by young and old.

LIST OF MAPS, BOOKS, JOURNALS, &c.,

ACQUIRED BY THE SOCIETY FROM JANUARY 1st TO DECEMBER 31st, 1894,
NOW IN THE LIBRARY.

With an indication of the maps, illustrations, and principal papers in the Journals.

MAPS.

GENERAL.

Map of the World, showing the Six Regions of the Geographical Distribution of Mammals. 8in. by 16in. Royal Geographical Society. * The Society.

EUROPE.

England and Wales, with lines of equal Magnetic Declination. January, 1894. * The Editor of the Colliery Guardian.

Manchester Ship Canal. General Plan, 1/63,360. Plan in three sheets, 1/31,680. Plan of Manchester Docks, about 1/7,000. Plan of Bridgewater Docks at Run-corn, about 1/3,500. Manchester Ship Canal Company, 1894. * The Company.

Turistkart over Norge. North and South plates. 1/800,000. F. Beyer, Bergen, 1892.

Officielle Karte vom Nord-Ostsee-Kanal, bearbeitet von der Kaiserlichen Kanal-Kommission in Kiel. Scale, 1/100,000. Verlag von Max Pasch, Berlin, 1890.

Karte des Nord-Ostsee-Kanals, gezeichnet von H. B. Jahn. Scale, 1/100,000. H. Eckardt, Kiel, 1893.

Rete-Adriatica. Strade Ferrate Meridionali Italiane. Eastern Italy, with Railways, 1894. * South Italian Railway.

Montenegro, Albania, and Novibazar, showing the Route of W. H. Cozens Hardy. Scale, 1in.=9.5 miles, or 1/600,000. London: The Royal Geographical Society, 1894. * The Society.

Map of Iceland, to illustrate paper by Dr. K. Grossmann. 1/2,000,000, or 32 miles to an inch. Royal Geographical Society, 1894. * The Society.

ASIA.

South-Western Arabia. Three sheets. 1/633,600, or 10 miles to an inch. Compiled in the Intelligence Division, War Office. No. 778. London, 1893. * The Director of Military Intelligence.

Map of the Country of the Arabian Horse. (To illustrate "The Arabian Horse, his Country and People." By Major-General Tweedie.) Scale, 73 miles to 1 inch (about). 1894. W. Blackwood and Sons, Edinburgh. * The Publishers.

Map of Hadramut, Arabia. Surveyed by Imam Sharif, Khan Bahadur, to illustrate the Explorations of J. Theodore Bent. 1/1,013,760, or 16 miles to an inch. Royal Geographical Society, London, 1894. * The Society.

Kafiristan. To illustrate the Journeys of G. S. Robertson, C.S.I. Scale, 1 inch=8 miles, or 1/506,880. London: The Royal Geographical Society, 1894. * The Society.

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Map of the Johore Territory. 1893. Surveyed and compiled by H. Lake, on Johore Government Service. 1/506,880, or 8 miles to an inch. Royal Geographical Society, 1894. *The Society.

The Central Part of Siam, showing the Route of H. W. Smyth, 1892-3. Scale, 1 inch=50 miles. London: The Royal Geographical Society. *The Society.

Tibet and the Surrounding Regions. Compiled from the latest information. 1/3,800,000, or 60 miles to an inch. Royal Geographical Society, London, 1894. *The Society.

Route Map of Explorations in Mongolia and Tibet, by W. Woodville Rockhill, in 1891-2. 1/2,027,520, or 32 miles to an inch. Royal Geographical Society, 1894. *The Society.

Lob Nor to Koko Nor. Map to illustrate the Journey of St. George R. Littledale, 1893. 1/2,027,520, or 32 miles to an inch. Royal Geographical Society, 1894. *The Society.

Map of the River Hoang Ho (Yellow River) from Lan-chau-fu to Bantu. 1/2,027,520, or 32 miles to an inch. Constructed from Observations taken by St. George R. Littledale, 1893. Royal Geographical Society, 1894. *The Society.

Special War Map of China, Corea, and Japan. London: George Philip and Son, 1894.

War Map of China and Japan. London: G. W. Bacon and Co., Limited.

Sketch Map of Korea. Scale 1/2,914,560, or 46 miles to an inch. No. 935, Intelligence Division, War Office. Based on the Map published in the Proceedings Royal Geographical Society, 1886. *The Director of Military Intelligence.

AFRICA.

Haut Niger au Golfe de Guinée. Par le Pays de Kong et le Mossi. Par le Capt. Binger. 2°—13° W. of Paris, 5°—14° N. 1/1,000,000, or about 16 miles to an inch. Paris, Service Géographique des Colonies, 1893. *M. le Ministre des Colonies.

Part of Sierra Leone, showing Routes from Port Lokko to Interior. 1/506,880, or 8 miles to an inch. No. 1016, Intelligence Division, War Office. 1893. Revised March, 1894. *The Director of Military Intelligence.

Map of the Hinterland of the Gold Coast Colony. Compiled by G. E. Ferguson. 1/1,030,000, or 16·25 miles to an inch. No. 984, Intelligence Division, War Office. London, 1894. *The Director of Military Intelligence.

Anglo-German Boundary in East Equatorial Africa, Mouth of Uмба River to Kili-manjaro. 2 sheets. Prepared by the Officers of the British Commission, 1892. 1/253,440, or 4 miles to an inch. No. 976 (a—b), Intelligence Division, War Office. *The Director of Military Intelligence.

Anglo-German Boundary in East Equatorial Africa, Mouth of Uмба and Vanga. Surveyed by the Officers of the British Commission, 1892. 1/63,360, or 1 mile to an inch. No. 977, Intelligence Division, War Office, *The Director of Military Intelligence.

Map of Part of British and German East Africa, including the British Protectorate of Uganda. Scale 1/1,584,000, or 25 miles to an inch. Intelligence Division, War Office, No. 1012. 1894. *The Director of Military Intelligence.

Map illustrating a Journey to Mount Kenia and Lake Baringo. By Dr. J. W. Gregory. 1/1,000,000, or 15·8 miles to an inch. Royal Geographical Society, London, 1894. *The Society.

Map of the Routes in Somali Land travelled by Lieuts. H. C. Lowther and C. F. S. Vandeleur in 1894. Scale 1/443,520, or 7 miles to an inch. Intelligence Division, No. 1047. *The Director of Military Intelligence.

The Country Round Suakin. Scale 1/255,440, or 1 in. to 4 miles. Intelligence Division, War Office, No. 1052. 1894. *The Director of Military Intelligence.

Diagram of the Suez Canal, with Sections. By J. Howard Reed. 1894. Scale 1 mile to an inch. 5½ ft. by 5 ft.. *Mr. J. Howard Reed.

AMERICA.

- New Official Railroad Map of the United States and Dominion of Canada. Scale 82 miles to an inch. Chicago: Rand, McNally, and Co., 1894. * Mr. C. H. Bellamy, F.R.G.S.
- General Map of the United States, with Index. W. and A. K. Johnston, London and Edinburgh, 1894. * The Publishers.
- Map of Colorado, showing Denver and Rio Grande System. Scale about 1/1,900,000, or 30 miles to an inch. * Mr. J. W. Slosson, Chicago.
- Grand Trunk Railway of Canada and Connections (with descriptive letterpress on back). * Grand Trunk Railway Company.
- Map showing the Railways of Canada to December 31st, 1891. Scale about 45 miles to the inch. 4ft. by 8ft. Office of Chief Engineer and Manager of Government Railways (2 copies, 1 mounted to roll and 1 mounted to fold). * The Hon. the Secretary of State, Canada.
- Canadian Pacific Railway and its Connections (with descriptive letterpress on back). * Canadian Pacific Railway.
- Western Canada, showing System of Land Survey and the Canadian Pacific Railway Company's Lines (descriptive letterpress on back, free farms, &c.), October, 1893. * Canadian Pacific Railway Company.
- Map of Manitoba. Published by Authority of the Provincial Government. 1/760,000, or 12 miles to an inch. Winnipeg, 1893. * The Canadian Pacific Railway.
- Index, showing Townships in Manitoba, N.W. Territories, and British Columbia (letterpress about railway lands, &c., on back). * Canadian Pacific Railway Company.
- Map of the Province of Manitoba and part of the North-West Territories of the Dominion of Canada. Scale, about 12½ miles to the inch. 4ft. by 7ft. J. Johnston, Geographer, Department of the Interior, Ottawa, June 30th, 1891 (mounted to roll). * Hon. Sir C. Tupper, G.C.M.G., High Commissioner for Canada.
- North-West Territories Land Map. Showing Position of Land Grants (with descriptive letterpress on back). * Canadian Pacific Railway Company.
- Sketch Map of Paths round Newcastle, Jamaica. By Major C. W. Gore. 1/31,680, or 2 inches to a mile. Intelligence Division, War Office, No. 980, London. * The Director of Military Intelligence.
- Map of the Republic of Paraguay. Drawn by Dr. E. de Bourgade. 1/1,000,000, or about 16 miles to an inch. (Paraguay: The Land and the People, &c.) London: G. Philip and Son, 1899.

OCEANIA.

- The Geography of Mammals. Map of the Australian Region, showing its Division into Five Sub-Regions. Royal Geographical Society, 1894. * The Society.
- Queensland and New Guinea. Constructed at the Surveyor-General's Office, Brisbane; with Additions and Corrections to 1894. Fifth issue. 10 sheets. Scale, 1/1,013,760, or 16 miles to an inch. * The Surveyor-General.

ATLASES.

- Philip's Systematic Atlas, Physical and Political. By E. G. Ravenstein, F.R.G.S. 250 maps, with introduction and index. London: George Philip and Son, 1894. * The Publishers.
- Atlante Scolastico per la Geografia Fisica e Politica di Giuseppe Pennesi. Fascicolo 1. Istituto Cartografico Italiano. Roma, 1894. Prof. G. E. Fritzsche, Director. * The Institute.
- Atlante Scolastico per la Geografia Fisica e Politica di Giuseppe Pennesi. Fascicolo II. Istituto Cartografico Italiano. Roma, 1895. * The Institute.

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- Atlas de Géographie Historique. Livraisons, 2, 3, 4. Librairie Hachette & Cie., Paris and London. * Messrs. Hachette, London.
- L'Année Cartographique. Supplément Annuel de Géographie et de Cartographie. Direction de F. Schrader. Years 2 and 3. Hachette & Cie., Paris.
- Pearl Atlas of the World. Mellin's Food Works.
- Atlas des Côtes du Congo Français. 22 sheets. Scale 1/80,000. * Paris: Sous-Secrétariat d'Etat des Colonies. Service Géographique. 1893.
- Atlas of Plans, &c., illustrating Perennial Irrigation and Flood Protection for Egypt. 1894. (See Report in Books.) * Ministry of Public Works, Egypt.
- Round the World. Coloured pictures for children. London: E. Nister.
- Portraits of Moffatt and Williams.
- Portrait of the late James W. Davis. * The Yorkshire Geological and Polytechnic Society.
- Views of Oxford. Oxford: Mowbray & Co.
- View of Niagara Falls (framed). Grand Trunk Railway Co., Canada. * Wainwright and Son.

BOOKS.

GENERAL.

- A Manual of Topographic Methods. By H. Gannett. With 18 plates 4°. Monographs of the U.S. Geological Survey. Vol. XXII. Washington, 1893. * The Director of the Survey.
- Method of Teaching Small Scale Topography. By Major Hon. M. G. Talbot, R.E. Intelligence Division, War Office, 1894. * The Director of Military Intelligence.
- Description of the Method of Executing Rapid or Reconnaissance Triangulation. By Major Hon. M. G. Talbot, R.E. Intelligence Division, War Office, 1894. * The Director of Military Intelligence.
- Le Projet de Carte de la Terre à l'échelle du 1/1,000,000. Rapport par J. V. Barbier, au Commission Technique de la Société de Géographie de l'Est, Nancy. * The Author.
- L'Unification Internationale de l'Heure et la Division Décimale du Temps. Rapport de Professeur Floquet à la Société de Géographie de l'Est, Nancy. * The Société.
- Le Temps Décimal. Avantages et Procédés pratiques. Par J. de Rey-Pailhade, Paris, 1894. * The Author through the Toulouse Geographical Society.
- Definitions of Geographical Names. By Dr. Konrad Ganzenmüller. Published by the Author, New York, 1894. * The Author.
- Applications of Physiography to History. By J. W. Redway. Educational Review, November, 1894.
- "Queenslander," June 9, 1894. Commercial Geography, &c., Lectures. * J. P. Thomson, F.R.S.G.S.
- Lexique Géographique du Monde Entier. Publié sous la Direction de Prof. E. Levasseur (de l'Institut). Par J. V. Barbier (Société de Géographie de l'Est). Parts 1, 2. Berger Levrault et Cie, Nancy, 1894. * The Publishers.
- The Geneva Oriental Congress. Reprinted from the Asiatic Quarterly Review, October, 1894.
- Congrès International des Orientalistes. Genève, 1894. Papers (bound). * Very Rev. L. C. Casartelli, Ph.D., Delegate.
- Year Book of the Imperial Institute for 1894. * The Imperial Institute.
- Imperial Institute. Annual Report for 1893.

- Index to the Periodicals of the World for 1893. Review of Reviews, London, 1894.
- Log of the "Princess Charlotte" from Calcutta to Liverpool, March 27th to August 18th, 1823. * Mr. Chas. Roeder.
- The Fifteen Decisive Battles of the World. From Marathon to Waterloo. By Sir E. Creasy, M.A. With plans. Thirty-ninth edition. London: R. Bentley and Son, 1894.
- My Favourite Authors. By Thomas Costley. 1894. * The Author.
- Tides and Tidal Phenomena considered in connection with Atmospheric Pressure. By W. Nelson Greenwood. Shipmasters' Society, London, 1894. * The Author.
- Protection from Lightning. By A. McAdie, U.S. Weather Bureau. Illustrated. Published by authority of the Secretary of Agriculture. 1894 * U.S. Weather Bureau.
- Wetter-Prognosen für die Monate Juli bis December, 1894. Von Rudolf Falb. Berlin: H. Steinitz. * J. W. Black, F.R.M.S.
- Select Extra-Tropical Plants, readily eligible for Industrial Culture or Naturalisation, with indications of their Native Countries. By Baron Ferd. von Mueller, K.C.M.G., &c., &c., Government Botanist for Victoria. Melbourne, 1891. * The Author.
- Sewage Treatment and Disposal. By R. J. Flintoff, F.C.S. * F. E. Flintoff.
- Nickel. By W. L. Austin, Ph.D. * The Colorado Scientific Society.
- Nickel. By P. Argall. * The Colorado Scientific Society.
- Solution of the Equations, $x^2 + Y = 7$, $X + Y^2 = 11$. By F. F. Freeland. * The Colorado Scientific Society.

BRITISH ISLES.

- The Relation of Art to the Welfare of the Inhabitants of English Towns. By T. C. Horsfall. Manchester: Cornish, 1894. * The Author.
- Maps of the Ordnance Survey: as they are and as they ought to be. By H. T. Crook, C.E. J. E. Cornish, Manchester, 1892. * The Author.
- Departmental Committee appointed by Board of Agriculture on Ordnance Survey. Report (C 6895), 1893. Minutes of Evidence, Appendices and Index (C 6895-1), 1893. Minute of Board of Agriculture (Dec., 1893) upon above Report (C 7257), 1894. * H. T. Crook, C.E.
- Royal Geographical Society. Supplementary Papers, Vols. II., III., and List of Fellows, Jan., 1894. * The Society.
- British and Irish Press Guide. 21st year. 1894. James Willing, London. * Mr. Willing.
- Co-operative Wholesale Societies Limited Annual for 1885, 1890, 1892, 1893. * The Co-operative Wholesale Society Limited, Manchester.
- Guide to London. With Sketch of History. Illustrated. London: Ward, Lock, and Bowden, 1894.
- Sir John Soane's Museum: General Description. By Wyatt Papworth, F.R.I.B.A. London: Wyman and Sons, 1893.
- Pocket Guide to the Midland Railway. With maps and illustrations. 1894.
- The Visitor's Guide to Oxford. Illustrated, and with plan on cover. Oxford: James Parker & Co. 1892.
- British Association. Oxford, 1894. Collection of Papers, Reports, &c.
- Historical Record of Some Recent Enterprises of the Corporation of Manchester. With illustrations and Maps. Prepared by the Town Hall Committee. Henry Blacklock and Co., Manchester, 1894. * The Town Hall Committee.
- Hydraulic Power Supply of the Manchester Corporation. With plan. 1894. * The Corporation.

- Cotton from Field to Factory. A City Post Office. By John Mortimer. Numerous illustrations. Reprinted from Hy. Bannerman and Sons' Diary and Buyer's Guide, Manchester, 1894. * The Author.
- The Story of the Manchester Ship Canal. Westminster Popular, No. 7. London, 1894.
- Port of Manchester and Its Equipment. With map and illustrations. Reprinted from the *Manchester Guardian*, September, 1894. * Ship Canal Co.
- Manchester Ship Canal. Schedules and Circulars in reference to Shipping Arrangements. * The Company.
- Manchester Ship Canal Handbook. Jan., 1894. * The Secretary.
- Manchester Ship Canal Guide Book. Illustrated. Abel Heywood and Son, Manchester, 1894.
- Interview with Joseph Lawrence on Manchester Ship Canal, June 6th, 1894. Reprinted from *Manchester Courier*.
- Manchester Art Museum. Report, 1893-94.
- Guide Book to the Palestine Exhibition. By the Rev. Samuel Schor. Manchester, 1894.
- Annual Report of the Manchester and Salford Sanitary Association and its Affiliated Societies for 1893. Manchester, 1894. * Mr. Fred Scott, the Secretary.
- Relics of Common Field System in and near Manchester. By H. T. Crofton. John Heywood, 1887. * The Author.
- Union of Lancashire and Cheshire Institutes. Questions Set at the Examinations, 1894. * The Union.
- Catalogue of Loan Collection of Pictures, Salford Jubilee Exhibition, 1894. With Memoir of the History of Salford, Peel Park, Royal Museum, and Art Gallery. Salford, 1894.
- Scheme for the Water Supply of South-East Lancashire. By H. T. Crook, C.E. With plan. 1885. * The Author.
- Sixteenth Annual Report of the Leigh Literary Society. Leigh, 1894.
- Leigh Technical School: Syllabus of Evening Classes, 1894-5.
- Rise and Progress of the Lancashire Watch Company, Prescott. Illustrated. 1893. * The Company.
- British Journal of Commerce, with Article on Lancashire Watch Company, Prescott. * The Company.
- A Few Days in the Life of a Royal Naval Cadet on Board H.M.S. "Britannia." London: G. Philip and Son, 1894. * H. N. Sullivan, Esq.
- Notes on a Series of Fossil Footprints, from Storeton, in Cheshire. By Osmund W. Jeffs. With photographic plates. Liverpool, 1894. * The Author.
- Guide to Alderley Edge, Prestbury, and Gawsorth. Illustrated. John Heywood, Manchester.
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- Ye Guide to ye Ancient Moorland Town of Penistone and the Interesting District Around. By John R. Dransfield. Penistone, 1892.
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- A Thousand Miles in Wharfedale. By E. Bogg. Illustrated.
- An Account of the Strata of Northumberland and Durham as proved by Borings and Sinkings. S.—T. North of England Institute of Mining and Mechanical Engineers, Newcastle-on-Tyne, 1894. * The Institute.
- Little Man Island. By Hall Caine. Maps and illustrations. Isle of Man Steam Packet Co., Limited, Douglas, 1894.
- Guide to the Isles of Scilly. By J. C. and R. W. Tonkin. With map. Penzance: F. Rodda, 1893. * Mrs. Walker.

EUROPE.

Presented by E. A. Martel, Esq.

(Extracts from Proceedings of various societies.)

- La Spélaologie. By E. A. Martel, 1893. 8pp. Association Fr. pour l'av des Sc.
- Les Levés Topographiques Sommaires dans les Explorations de Cavernes. By E. A. Martel, 1892. 7pp. With plan. Congrès des Sociétés avantes.
- Sous Terre (Fourth Campaign). By E. A. Martel. 39pp. With plans, views, and sections. Club Alpin Français, 1891.
- Sous Terre (Fourth Campaign). By E. A. Martel. 48pp. With sections, &c. Soc. Sc. Hist. et Arch. de la Corrèze, 1891.
- Sous Terre (Fifth Campaign). By Martel and Gaupillet. 39pp. With plans and views. Club Alpin Français, 1892.
- Sous Terre (Sixth Campaign). By E. A. Martel. 23pp. With plans, views, &c. Club Alpin Français, 1893.
- Sous-Sol des Causses. By E. A. Martel. 39pp. With plans and sections.
- Causses du Languedoc. By E. A. Martel. 39pp. 1890.
- Recherches dans le Lot en 1892 et 1893. By E. A. Martel. 42pp. With plans and sections.
- La Géologie des Grottes. By Lainay et Martel. 24pp. With sections. Soc. Géologique de France.
- Eaux Souterraines des Causses. By E. A. Martel. 20pp. With plans and sections. Club Alpin Belge, 1889.
- La Grotte de Saint-Marcel d'Ardèche. By E. A. Martel. 8pp. With plans, &c.
- La Rivière Souterraine de Bramabiau, 1888—1892. By E. A. Martel. 27pp. With plans and views. Sc. de Geog., Paris.
- Les Causses. By E. A. Martel. 15pp. Sc. de Topographie, 1886.
- Six Pamphlets on the Caverns, &c., of the Causses. By E. A. Martel, &c. Extracts from the "Comptes-Rendus des Séances de l'Académie des Sciences." 4pp each.
- Les Aiguilles du Gouter et d'Argentière. By E. A. Martel. 49pp. Illustrated. Club Alpin Français, 1887.
- Le Linththal et le Tödi. By A. Martel. 11pp. Illustrated. Club Alpin Français, 1890.
- Les Gorges et Ponts Naturels de l'Argens, &c. (Alpes). By G. Gaupillat. 12pp. Illustrated. Club Alpin Français, 1893.
- Sparte et les Gorges du Taygète. By A. Martel. 31pp. Illustrated. Club Alpin Français, 1891.
- Les Katavothres du Péloponèse. By E. A. Martel. 21pp. With plans. Revue de Géographie, 1892.
- Nouvelle Carte d'Italie au 100,000e. 8pp.
- Carte d'Autriche au 75,000e. By E. A. Martel. 6pp. Revue de Géographie, 1886.
- En Ballon Libre. By G. Gaupillat. 22pp. Illustrated. Club Alpin Français, 1891.
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145. London. Wesleyan-Methodist Missionary Society. 80th Report, 1894.
146. London. Wesleyan Missionary Notices. January to December, 1894.
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149. Mangalore. Basel German Evangelical Mission in South-Western India. 54th Report, for 1893.
150. Paris. Missions à Afrique. Bulletin. Nos. 103-108.

BRITISH.

153. Belfast. Belfast Natural History and Philosophical Society. Report and Proceedings, 1892-93.
154. Birmingham. Birmingham Philosophical Society. Proceedings. Vol. VIII. Part 2, 1892-93, and Annual Report.
155. Burnley. Literary and Scientific Club. Transactions. Vols. IX. and X., 1891-92.
156. Cardiff. Naturalists' Society. Report and Transactions. Vol. XXV., Part 2, 1892-93 ; with map of the Society's district. XXVI., Part 1, 1893-94.
158. Croydon. Microscopical and Natural History Club. Proceedings and Transactions from February 8, 1893, to January 16, 1894.
159. Edinburgh. Royal Scottish Geographical Society. Magazine. Vol. X., 1-12.
160. Glasgow. Geological Society.
161. Glasgow. Philosophical Society. Proceedings for 1893-94. Vol. XXV.
162. Glasson Dock, Lancaster. Greenwood's Nautical Almanac, General and Kludnometric Tide Tables, &c., for the British Isles and adjoining Coasts, 1895.
163. Halifax. Yorkshire Geological and Polytechnic Society. Proceedings. Vol. XII., Part 4, 1894.
164. Hertford. Hertfordshire Natural History Society and Field Club.
165. Leeds. Leeds Geological Association. Transactions. Part 9, 1893-4.
166. Leeds. Yorkshire Naturalists' Union.

- 166A. Leeds. Yorkshire Union of Institutes and Village Library. Annual Report, 1894.
167. Leicester. Leicester Literary and Philosophical Society. Transactions. Vol. III., Nos. 3-9.
168. Liverpool. Geographical Society. Second Annual Report, 1893.
169. Liverpool. Geological Society. Proceedings, 1893-4. Vol. VII., Par: 2.
170. London. Anti-Slavery Reporter. 1894, January to December. (March—April missing.)
171. London. British Association for the Advancement of Science. Report of the 63rd Meeting. Nottingham, 1893.
172. London. East India Association. Journal. Vol. XXVI., Nos. 2, 3, 4. (No. 1 not received.)
173. London. The Colliery Guardian. 1894. Nos. 1723 to 1774.
174. London. Emigrants' Information Office. Combined Circulars for Canada, Australasia, and South Africa. Quarterly. 1894.
175. London. Royal Colonial Institute. Report of Proceedings. Vol. XXV., 1893-94.
176. London. Royal Geographical Society. The Geographical Journal. Vol. III., 1-6; IV., 1-6.
— London. Imperial Institute. (See list of books.)
177. London. Royal Gardens, Kew. Bulletin of Miscellaneous Information. January to December, 1894, with Appendices I., II., and III.
178. London. Royal Society of Literature. Transactions. Vol. XVI., Part 2.
179. London. Review of Reviews. September to December, 1894.
- 179A. London. War Office Catalogue of Maps. Accessions. January to December, 1894.
- 179B. London. India Office. List of Maps, Plans, &c., of India, and other parts of Asia. Appendices, Nos. 9, 11, 12.
180. Manchester Chamber of Commerce. Monthly Record. Nos. 1-11, 1894.
181. Manchester. Co-operative Wholesale Societies Limited. 'Annual for 1894. (Presented by Councillor H. C. Pingstone.)
182. Manchester. Manchester Geological Society. Transactions. Vol. XXII., Parts 14-21.
183. Manchester. Manchester Literary and Philosophical Society. Memoirs and Proceedings. 1893-4, Vol. VIII., Nos. 1-4.
184. Manchester. Field Naturalists' and Archaeologists' Society. Report and Proceedings. 1893.
185. Manchester. Statistical Society.
186. Manchester. Textile Mercury, Nos. 246-293. 1894.
187. Manchester. Textile Recorder. Nos. 129-140.
188. Manchester. Union of Lancashire and Cheshire Institutes. 55th Report. 1894.
189. Manchester. Geographical Society Journal. Vol. IX., Nos. 1-12.
190. Newcastle-on-Tyne. Tyneside Geographical Society Journal. 1894, Vol., II., No. 5; III., 1.
191. Newcastle-on-Tyne. North of England Institute of Mining and Mechanical Engineers. Transactions. Vol. XLIII., Parts 2-6. Annual Report of Council. Report of Proceedings of Flameless Explosives Committee. Strata of Northumberland and Durham. (See list of books.)
192. Penzance. Royal Geological Society of Cornwall. Transactions. Vol. XI., Part 8.
193. Salford. Museum, Libraries, and Parks Committee. 45th Annual Report, 1892-93.
194. York. Yorkshire Philosophical Society. Annual Report for 1893.

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Only the most important papers have been indicated. A very large number of smaller articles of great interest will be found on reference to the books themselves.

* * The black figures refer to the number of the Journal in the preceding list, and the lighter figures the pages where the information is to be found.

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- Columbus and his Discoveries, with portrait. (56a. 465.)
- Columbus Celebrations in 1892. (59a. 257.)
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THE GEOGRAPHICAL ASSOCIATION AND GEOGRAPHY IN SECONDARY SCHOOLS.

EVER since the publication in 1886 of Mr. Keltie's report on Geographical Education in England, there have been many signs of improvement in various directions. Unfortunately this awakening to the claims of Geography has not extended in the same degree to the majority of Secondary Schools. The Geographical Association was founded at a meeting of school masters held in Oxford in May, 1893, in the hope that the status and teaching of Geography in Secondary Schools might be improved. The Committee have already made a move in the direction of providing improved aids and materials for instruction by preparing lantern slides designed especially to lead to the comprehension of geographical principles, rather than the acquisition of isolated facts, and a further extension of this work to other methods of illustration is contemplated. The Committee has further determined (1) to publish from time to time accounts of successful methods of teaching Geography on the above lines; (2) to draw up a systematic list of Standard and Recent Geographical Works, other than School Text Books for the guidance of teachers; (3) to co-operate as far as possible with the Geographical Section of the Teachers' Guild Museum, so as to prevent overlapping. Lastly, as a direct result of a correspondence with the Educational Committees of the Royal Geographical Society, and of the Royal Colonial Institute, an effort has been made to collect from the Secondary Schools opinions on the changes desirable in these examinations, which largely determine the time allotted to each subject in the curriculum, and to a great extent also the methods of teaching. Four suggestions were circulated by a Sub-Committee of the Association, among some 300 Secondary Schools. The report on the 92 answers received, which include expressions of opinion from nearly all the great public schools may be briefly summarised as follows, the substance of the original suggestions being printed in italics. (1) *Papers in Geography should be set and looked over by Geographical experts, who have also had experience in teaching and examining boys.* (2) *The Principles of Physical Geography should form part of every examination in Geography.* (3) *The subject of Geography is too wide and vague, and needs to be limited and defined for the purposes of examination.* A general knowledge of the Earth should be required in all cases, together with a special study of some region, such as a Continent, India or the British Colonies. To indicate the general line of teaching to be followed, and the order in which the special subjects would be taken, might be issued from time to time by the board of examiners jointly. Or a text-book might be published by authority for the guidance of teachers and examiners alike. (4) *Geography should either be made compulsory, or receive enough marks to make it "pay."* To this it is objected that the pressure of compulsory objects is already so great that any addition to their number would be intolerable. But the modified form of compulsion implied in the latter alternative is regarded as less objectionable than compulsion pure and simple. Many valuable suggestions have also been received which the Committee propose carefully to consider before moving any further in the matter. The report (of which the above is a very brief summary) may be had on application to the Hon. Sec., Mr. B. B. Dickinson, Bloxam House, Rugby.

EDINBURGH.

Notes of an Address by Mr. A. J. HERBERTSON, F.R.G.S.

Edinburgh, Dunedin, The Fortress on the Hill Top, necessarily grew at first round the castle rock, the filled-up vent of an old volcano, and down the ridge, shaped in glacial times. Lochs and marshes prevented easy access to this place, whence an approaching enemy could be seen for miles around. The burgesses built their houses near the castle, where they could retire in times of danger, and the importance of the town grew with the increasing pacification of the surrounding country, and the frequency of royal residence. But confined to the ridge and bounded by walls the city could grow only by building houses closer and higher. From the castle ran a narrow path, which opened out to the wider High Street, blocked in the middle by the great Church of St. Giles, and narrowing again beyond the city wall. From this street down the sides of the ridge, wynds or closes, ran so narrow that they could be defended by a single swordsman. The first phase of Edinburgh was that of a fortress town clustering round a castle. But round the Abbey of Holyrood, when times grew more tranquil, and royalty reared a palace, the nobles built their mansions, and the second phase of Edinburgh is that of a city whose centre was the Court at Holyrood House. Even before the Union of Crowns, St. Giles had become a centre for the growing burgesses, who at all times had discussed and regulated their affairs among themselves, and brought their disputes to the parish priest for settlement and criminals for punishment. In later days, when the city had grown, the Tolbooth prison was raised outside the church, and there still exist the Municipal Buildings in the Royal Exchange on the north, and the College of Justice on the south side of St. Giles. Several other instances of the evolution of the city were given, and the decay of Edinburgh after the Union of Scotland and England explained. With the development of modern industry Edinburgh again began to grow, and quieter times allowed the citizens to build beyond the walls. The rapid extension of the stately new city and the relationship to the wonderful growth of Edinburgh as a literary centre was pointed out; and newer movements of expansion now going on were alluded to. The lecture was illustrated by numerous beautiful slides, kindly lent by the Old Edinburgh School of Art which is doing so much for the restoration of the picturesque and characteristic character of the old town.

Commercial Museum.—The *Society of Arts Journal* gives an account of the establishment of a Commercial Museum at Philadelphia, U.S.A., founded and maintained by the municipal authorities. It is singular that, on the Continent and now in America, these establishments are found necessary and useful. In this country which has a real need, if the commercial condition is not to be severely jeopardised, no impression can be made upon the authorities in this direction. Doubtless, when the steed is stolen the local authorities will lock the stable-door. The gigantic efforts which have been made by the local authorities in the direction of Technical Education would not have been needful, and, perhaps, sounder methods in some cases, and less expensive, would have been incurred if movements had been begun when attention was directed to the need of the rising generation. And even now there is a lack of grip in the co-ordination of effort on the part of the various local authorities. The overlapping is serious, and the money by which the expense is paid is of doubtful continuance. If it should cease to be levied and paid, a serious expense will be thrown on the localities. In the case of a Museum of this kind, the cost is not a large one, and the value to a great commercial community like Manchester is self-evident.—*Colliery Guardian*, Nov. 15, 1895.

THE
MANCHESTER GEOGRAPHICAL SOCIETY.

RULES.

I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be :—

1. To further in every way the pursuit of the science, as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with Consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.

2. To hold meetings at which papers shall be read, or lectures delivered by members or others.

3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.

4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.

5. To inquire into all questions relating to British and Foreign colonisation and emigration.

6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.

7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.

8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.

10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence), and twenty-one Councillors.

11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.

12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months from the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

IV. PAYMENTS.

18. Any ordinary member shall pay an annual subscription of £1 1s., or he may compound by one payment of £10 10s. An associate member shall pay an annual subscription of 10s. 6d. The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

ORDINARY MEETINGS.

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of proceedings shall be as follows:—

- (a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.
- (b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.
- (c) The election of new members to be declared and the names of candidates to be read.
- (d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest the Council may make provision for a larger admission of visitors.

ANNUAL MEETINGS.

30. The Annual Meeting of the members shall be held at such time and place as the Council shall determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

SPECIAL GENERAL MEETINGS.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

VI.—COUNCIL AND OFFICERS.

THE COUNCIL.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman.

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committees shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

PRESIDENT AND VICE-PRESIDENTS.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

CHAIRMAN OF THE COUNCIL.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and Officers, and to summon, when necessary, special meetings of the Council and of Committees.

TREASURER.

45. The Treasurer has the charge of all accounts ; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by two members, who shall be elected at an ordinary meeting at least one month before the Annual Meeting.

SECRETARIES.

49. The duty of the Honorary Secretaries shall be :—

- (a) To conduct the correspondence of the Society and of the Council.
- (b) To attend the meetings of the members and of the Council, and minute their proceedings.
- (c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting ; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.
- (d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

The foregoing Rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894.

(Signed)

GEORGE, *President.*

S. ALFRED STEINTHAL, *Chairman.*

F. ZIMMERN, *Honorary Secretary.*

JAS. D. WILDE, M.A., *Honorary Secretary.*

ELI SOWERBUTTS, *Secretary.*

[COPY.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895.

E. W. B.

LIST OF MEMBERS,

December 31st, 1894.

Note.—H signifies Honorary, C—Corresponding, L—Life, A—Associate, * Affiliated Societies. All others are Ordinary Members.

- | | |
|--|--|
| H Aberdare, The Right Hon. Lord, G.C.B. | Biema, C. Van |
| Adam, Sir Frank Forbes, C.I.E. | Birch, Herbert |
| L Ainsworth, John (Machakos, Ibea). | Birley, Thomas Hornby |
| Aldred, Thos., F.C.A. | Black, Surgeon-Major J.M., F.R.C.S.E. |
| Aldred, Wm., F.C.A. | Blackburn, James |
| Alexander, Bernard | Blake, George Ingle |
| Alexander, W. T. | A Blake, Henry Neville |
| A Allen, C. H., F.R.G.S. | Blake, John Charles, F.R.G.S., |
| Anson, The Ven. Archdeacon | F.I.Inst. |
| Armistead, Richard | Blake, Percy C.D., M.A. |
| Armitage, Benjamin, J.P. (Chomlea). | A Blelock, W. |
| Armitage, H. A. | Bles, A. J. S. |
| Armitage, Sam. | Bles, Marcus S., J.P. |
| Armitage, Alderman, V. K., M.A., J.P. | Boardman, James, F.C.A. |
| Arning, Charles E. | L Boddington, Henry, J.P. |
| Arnold, W. A. | C Bodio, Professor Luigi, Rome. |
| Aron, Ludwig | Boiadjieff, K. N. |
| Ascoli, E. | Bolton, H. Hargreaves |
| Ashworth, Francis | H Bonaparte, Prince Roland, Paris |
| Ashworth, Thomas E. | Booth, James, J.P. |
| | Booth, Samuel |
| Baddeley, John, J.P. | A Booth, William |
| Bagley, Ralph | A Bosworth, George R. |
| Bailey, Alderman Sir W. H., J.P. | A Bottomley, J. Alfred |
| Balfour, The Right Hon. A. J., M.P. | A Bowes, Miss L. B. |
| Ballantine, Major R. F. | Bowes, George T. |
| A Balmer, A. W. | A Bowker, A. W. |
| Balmer, J. E. | Boyd, T. W. |
| Barker, James | Braddon, Conncillor C. H., M.D., J.P. |
| Barker, John Lees | Bradley, William |
| Barker, Reuben C. | Bradshaw, Wm. |
| Barker, Richard | Brammer, G. F. |
| A Barlow, James | Bramwell, Samuel |
| Barlow, John R., J.P. | A Bramwell, Thomas |
| Barton, Wm. | Brettauer, L. |
| Bate, James, jun. | Brier, Charles |
| A Bates, John, B.A. | A Brierley, R. B., B.A. |
| Bates, Alderman Ralph, J.P. | Bright, The Right Hon. Jacob, M.P. |
| A Batho, Thomas | A Brooks, E. J. |
| Beer, Walter | Brooks, Councillor S. H., F.I.Inst. |
| Behrens, Charles, Vice-Consul for Mexico | Broome, Joseph, J.P. |
| Behrens, Gustav, J.P. | C Brower, Hon. J. V., St. Paul, Minn., |
| Behrens, Henry | U.S.A. |
| Behrens, Oliver P. | Brown, John H. |
| Beith, Gilbert, M.P. | Brown, R. Hope, Bolton |
| Beith, J. A., J.P. | Brown, R. Hope, jun., Manchester |
| H Belgians, His Majesty the King of the, | C Bryce, J. Annan |
| K.G. | Bubier, Louis |
| A Belisha, B. I. | A Buckley, B., J.P. |
| Bellamy, C. H., F.R.G.S. | Buckley, W. H. |
| Berry, Harold | * Burnley Literary and Scientific Club |
| Berry, Joseph | L Burton, Frederic |
| Berthoud, H. L. | Burton, W. J. |
| A Bessant, W. S. | Butler, E. |
| A Bickerton, Richard | Bythell, J. K. |

- A Cadman, Wm.
 Calvert, D. R.
 Camm, Thomas
 Campion, G. G.
 A Cardwell, J. J.
 * Carlile Institute, Meltham
 A Carpenter, James
 Carver, Benjamin, J.P.
 Casartelli, Very Rev. L. C., M.A., Ph.D.,
 Rector of St. Bede's College
 c Casati, Captain G.
 Cawley, Councillor Frederick
 Chadwick, John, J.P.
 A Chapman, Alfred
 Cheetham, J. F., J.P., F.I.Inst.
 A Cheetham, Walter
 Cheetham William
 Chivers, C. T.
 Chorlton, Isaac
 Chorlton, J. C.
 A Churchill, Miss L. E.
 Churchill, Wm. W., jun.
 Churchill, W. S.
 Clapham, John, J.P.
 A Clarke, Charles A.
 Clarke, J.
 Clarke, H. W.
 Clegg, Neville
 Clemson, T. W.
 c Clerke, Miss E. M., London
 A Cohen, Meyer
 c Colbeck, Rev. A., Guernsey
 Collier, Edward
 c Colquhoun, A. R., F.R.G.S., M.I.C.E.
 c Coningham, Lieut. H. J., F.R.G.S.
 A Cooper, Thomas P.
 Corbett, William
 Corbishley, Rev. Thomas
 Core, Professor T. H., M.A.
 Costeker, Charles
 Costley, Thomas
 Cottingham, James
 A Cottrill, J. J.
 Cowburn, W. H.
 Cowper, James P.
 Cox, J. J., M.D.
 Crabtree, William Henry
 A Cranston, Rev. G.
 Crewdson, Alfred
 Crofton, H. T.
 Crook, H. T., C.E.
 Crowther, Miss J., Blackley
 Crowther, Miss E., Altrincham
 Crossley, Joseph
 Crum, William G.
 Cruse, Henry
 A Cunliffe, W. J.
 Curbstone, Walter
 Darbshire, Bernhard V., F.R.G.S.
 A Davies, Charles J.
 Davies, Edward
 A Davies, Ishmael
 A Davies, Peter
 Davies, Richard
 Davies, S. Bevan
 Davies, W.
 Davies, W. H.
 A Davies, W. W.
 Dawkins, Prof. W. Boyd, M.A., F.R.S.
 Dawkins, Mrs. W. Boyd
 A Dawson, Charles
 Day, Miss
 Deakin, Edward, jun.
 Dean, Councillor J.
 Dearden, John K.
 Dehn, Rudolph
 A Delmas, Philippe
 Dent, Hastings C., C.E., F.L.S., F.R.G.S.
 Dentith, Thomas
 Derby, The Rt. Hon. the Earl of, G.C.B.
 A Derbyshire, R. S.
 Devonshire, His Grace the Duke of, K.G.
 Dillon, Lawrence
 Dobson, Robert
 A Donald, James
 Done, B. C.
 Done, Richard
 Donnell, Joseph
 Donner, Edward
 Dore, J. M.
 A Douglas Percy, Meshed, Persia
 A Dowdall, J. B.
 Drew, T. H.
 Dreydel, Thos.
 Dreyfus, Dr. Charles
 Duckworth, Cephas
 Duckworth, Alderman James, J.P.
 A Dyson, Humphrey
 A Dyson, Samuel
 Eason, Edward A.
 Eastwood, W. H.
 * Eccles Prov. Ind. Co-op. Soc., Ltd.
 Eckersley, James, J.P.
 Eddy, Raymond T.
 Edminson, L. T.
 Edmondson, James
 Egerton of Tatton, The Right Hon. the
 Lord
 Eggington, Councillor Thomas, J.P.
 Eichholz Adolphus
 Eliazarian, S.
 Elwen, George
 A Ely, J.M.
 Entwistle, H. H.
 Evans, William T.
 A Fairbrother, Geo.
 Fairley, J. D.
 Falconer, Geo. R.
 Farish John
 A Farron, Thomas
 A Fearnley, Frank
 Fergusson, The Right Hon. Sir James,
 Bart., M.P.
 c Fief, J. du, Royal Belgian Geographical
 Society
 Findlay, Bruce

- Findlow, Percy
 Fleming, Hugh
 Fletcher, Alfred James
 A Fletcher, Daniel, C.C.
 Flux, Alfred Wm.
 A Ford, James
 Forrest, Alexander, J.P.
 Fortb, Isaac
 Frank, Ernest
 A Frank, L.
 Frankenburg, Councillor L.
 A Freeman, W. C.
 H Freshfield, Douglas W., F.R.G.S.
 Froehlich, The Chevalier Robert K.C.I.,
 Vice-Consul for Italy
 A Frood, Mrs. H.
 A Fullerton, Hugh, J.P.
 A Furniss, Martin
- Gadd, The Right Rev. Monsignor
 Canon, V.G.
 Gaddum, Alderman G. H., J.P.
 Gallé, A. R., Consul for Belgium, and
 the Congo State
 Galloway, Alderman George, J.P.
 A Garner, Charles T. J.
 Garnett, Jeremiah, J.P.
 Garnett, Stewart, J.P.
 A Gelder, R. D.
 A Gerrard, James
 A Gibson, H., B.A., Auckland, New Zealand
 Gibson, Wm. Yates
 Giles, J. O.
 Gill, John W.
 Gleave, Joseph James
 Gleim, Fred
 Glossop, J. P. B.
 Goldschmidt, Councillor H. J.
 H Goldsmid, Major-General Sir Frederic J.,
 C.B., F.R.G.S.
 Goldsmith, Henry
 Goodbehere, Frederick
 Goodwin, Alfred
 Goodwin, Harvey, J.P.
 Goulden, Miss
 Gower, James E., Tenby, S. Wales
 A Grady, S.
 Gray, Henry, London
 A Gray, James A.
 Greaves, Hilton, D L., J.P.
 Greaves, W. McG.
 Green, John, Pembroke Dock, S. Wales
 Greenhow, Councillor J. H.
 Greenland, R.P.
 A Greenough, Richard, Leigh
 Greenwood, B. H.
 Greenwood, Alderman Jas., J.P.
 Greenwood, Councillor John, J.P.
 A Greenwood, W. Nelson, F.R. Met. Soc.,
 F.I.Inst., Glasson Dock
 Greg, Arthur, J.P., F.R.G.S., F.I.Inst.
 Greg, Ernest W.
 L Greg, Francis, J.P.
 Gregory, Theodore, F.C.A.
- Gregory, E. A.
 H Grey, Sir George
 Grimshaw, Wm.
 Grimstone, Henry
 A Grindley, Charles W.
 Gudgeon, Robert
- Hague, J. D., Stockport
 Hablo George, J.P.
 Hall, J., M.A., Hulme Grammar School
 Hall, J. Howard, Bury
 C Hallett, Holt S., M.I.C.E., F.R.G.S.
 Halliwell, Joseph
 Hallworth, Joseph
 Hambly, Richard
 Hamer, William
 A Hampson, Councillor Joshua
 Hampson, T. W.
 Hardman, John, Radcliffe
 Hargreaves, George
 Harker, George
 Harker, Thomas
 Harrison, J. Dilworth, F.I.Inst.
 A Harrison, John
 A Harrison, W. S.
 Harrop, John
 A Harwood, C. H.
 Hassall Thomas
 Hatton E.
 Hawke, Edward G., B.A.
 Hawkins, William
 Haworth, Abraham, J.P.
 Haworth, G. C., J.P.
 Haworth, J. F.
 L Healey, Alderman W., Heywood
 Heap, Alderman J. R., J.P., Rochdale
 A Heap, William
 Heap, Alderman W. T., J.P., Rochdale
 Heape, Charles
 Heaven, Joseph Robert
 Heginbotham, John, Stalybridge
 Heine, A.
 Helm, Elijah, Chamber of Commerce.
 Helm, S. L.
 Herbertson, A. J.
 A Hewit, R. P.
 Hewlett, E. G. W., B.A.
 Heywood, Percy
 Heyworth, Eli, J.P.
 Higham, Councillor J. Sharp, Accrington
 A Higham, Sydney
 Hill, Rev. William
 Hilton, Fred
 A Hindley, Councillor C. E., Eccles
 A Hinners, Edward
 A Hinners, Mrs. E.
 L Hinners, William, J.P.
 Hinrichsen, S.
 Hodgson, Joseph
 A Hodgson, William
 Hodson, J., Junr.
 A Holden, Henry
 Holder, H. W., M.A.
 Holdsworth, John

▲Holland, Job
 ▲Holland, John, Radcliffe
 ▲Hollins, James
 ■Holmwood, Fred., H.B.M. Consul
 Holt, Wm.
 Hopkinson, Alderman J., J.P.
 Hopkinson, Edward, D.Sc.
 Houldsworth, Sir W. H., Bart., M.P.
 Howe, George
 Hunt, Walter J.
 ▲Hurrell, J. Weymouth
 Hurst, C. J.
 Husband, Alderman R., J.P.
 Husband, W. E., M.R.C.S.
 Hutton, Alfred
 L Hutton, J. Arthur

 Illingworth, Charles
 Irlam, Job
 ▲Isherwood, Edward
 Ivison Thomas

 cJackson, James, Paris
 Jackson, Fred. E.
 Jackson, Fred J.
 L Jackson, George
 ▲Jackson, Dr. U. A., F.C.S.
 Jackson, William
 Jacoby, Gustav
 Jaffé, Paul
 ▲Jakens, Joseph
 Jefferis, Frank
 Johnson, J. Thewlis
 Johnson, Lionel M.
 Johnson, William
 Johnson, Mrs. W.
 cJohnston, H. H., F.R.G.S.
 Johnstone, Charles Andrew
 Jones, W. C.
 Jordan, Albert

 Kalisch, M.
 Kay, Isaac
 Kay, Robert
 Kay, W. W.
 Kelley, Councillor G. D., J.P.
 Kemp, T. W.
 Kennedy, John L., J.P.
 Kershaw, B.
 Kessler, Henry
 Kessler, William
 Kessler, William, jun.
 Keymer, J. H.
 Keymer, Sydney L., F.R.G.S.
 Keyte, W. R.
 Killock, John
 Killock, Matthew
 Kinch, W. S.
 King, J. E., M.A., Manchester Grammar
 School
 King, Joseph
 Kirkpatrick, Henry
 Kirkpatrick, Robert
 Kolligs, F. H., Consul for Ecuador

Kolp, N.
 Knoop, Hy. L.
 Kullmann, Julius

 Laidlaw, Adam
 Lambert, James J.
 ▲Lancashire, J. R.
 ▲Lancaster, James
 Langley, H. M., Consul for Honduras
 and Salvador
 Lanzoni, Prof. P., S. Angelo, Italy
 cLatham, J. P., Paris
 ▲Law, Miss Annie E., L.L.A.
 ▲Law, T. H.
 Lawson, R. G.
 Ledsham, J. B.
 ▲Ledward, H. Davenport
 ▲Lee, Harry
 Lee, Henry, J.P.
 Lee, Lennox B.
 Leech, A.
 Leech, Alfred
 Leech, Alderman Sir Bosdin T., J.P.
 Leech, Lady Bosdin T.
 ▲Leech, Miss
 Leech, Professor D. J., M.D.
 ▲Leech, Samuel
 ▲Leech, Wm. Booth
 ▲Leeman, E.
 Leigh, Charles H.
 Leigh, Alderman Sir Joseph, M.P.
 Leite, J. Pinto, Consul for Portugal
 Lejeune, A. E.
 Levinstein, Ivan
 Levy, Eliot
 ▲Lewis, J. H.
 Lewis, J. Tetlow
 Liebert, Emil, Consul for H.I.M. the
 Emperor of Germany
 Linton, R. J.
 Little, David Ainsworth
 Little, Mrs. D. A.
 ▲Lloyd, J. W.
 Lomax, X
 ▲Longworth, Charles H.
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HON. J. V. BROWER.

FROM A PHOTOGRAPH BY SWEM.

FIRST COMMISSIONER OF THE ITASCA STATE PARK, U. S. A.

THE JOURNAL
OF THE
MANCHESTER GEOGRAPHICAL SOCIETY.

PREHISTORIC MAN AT THE HEADWATERS OF THE
MISSISSIPPI RIVER.*

By HON. J. V. BROWER, St. Paul, Minn., U. S. A., First Commissioner of the
Itasca State Park.

[Read to the Society in the Library on Wednesday, March 13th, 1895.]

INTRODUCTORY CONSIDERATIONS.

The State of Minnesota has received and accepted the results of my labor on behalf of the permanent establishment of the state park at Itasca lake, with no provision of any kind whatsoever for per diem and the cash expenses, paid in full from my own private means.

The State Historical Society has received and published my report, in Vol. VII. of its Historical Collections, concerning the source of the Mississippi, without any provision for the expense connected with the detailed hydrographic survey made.

The Legislative Manual for 1895, at pages 222-225, demonstrates the value placed upon my official services, faithfully rendered, in bringing to the state a valuable and permanent franchise, and to the notice of the governor an important archaeological discovery within the confines of the park, at the northern extremity of the Itasca basin.

Now, free to act according to the dictates of my own inclination, in this latest light bearing upon a more complete history of that remote and picturesque park locality, I certainly will not entertain a regret, if, by contributory action, I may add to the knowledge of mankind the information contained within these brief pages, simply in a narrative form and on my own account.

*Mr. Brower has added to the paper further notes on his explorations and has very kindly contributed the illustrations. Since the date of the introductory there has been received by Mr. Brower a magnificent set of prehistoric copper implements from the Upper Mississippi, which have been specially engraved for this number of The Journal.

An instance, or rather a mode of procedure, on the part of my associate exercised recently at St. Paul, in withholding from publication the manuscript accumulated as the results of long years of scientific labor, and now left only as an estate for administration, assuming that deterioration is certain to follow, admonishes me to promptly give to the world whatever small and insignificant contribution I am able to make, as the results of original explorations, requesting only such reasonable credit as might be awarded other and more worthy explorers.

The results presented herein are but an initiation of what ought to follow, in an interesting field for observation and research, by official authority, while there is yet time to preserve to ourselves and to posterity valuable information, not certainly known to be obtainable until the results of these separate expeditions were reached.

That some errors appear in the small charts presented is probable, and these can be excused in the absence of any detailed surveys, and can be otherwise overlooked on account of the necessity of depending upon others for preparations which should have received my personal attention.

The deteriorating conditions surrounding that which was left so long ago, to designate the localities occupied by the Mound-Builders, in the field explored, leaves but sparingly of that which is necessary to successfully determine their true character, the time of their advent and the cause of an enforced disappearance or a mysterious departure.

Now that it is certain that the old and well-known portages leading to and from the upper basin of the Mississippi, through dense forests and over innumerable hills, were the highways of prehistoric man, we can well extend to their memory an expression of admiration for a geographical ability scarcely eclipsed by the scientific preparation of their dead for burial, as evidenced by remains that, for centuries, have withstood the ravages of time and the inevitable disintegrating influences of the elements. Heretofore the Ojibway Indian has received the credit for discovering and opening these great prehistoric trails. Now we know he but followed in the footprints of his unknown predecessors.

To Rev. S. Hall Young and Rev. T. M. Shanafelt, D. D., who were my companions during the first voyage narrated, Mr. F. J. Steinmetz, who rendered material assistance during the second exploration, and Prof. T. H. Lewis, as an active member of the discovering party of 1895, are due and tendered my grateful acknowledgments for considerations of esteem and respect agreeably awarded to me, often under trying circumstances which overtook us, at times, in the region traversed.

Dr. Elliott Cones, Rev. J. A. Gilfillan and Mr. Peter Sutherland have unselfishly contributed toward a successful termina-

tion of labors commenced, and the opportunities of that broader field, now a voluntary choice, are augmented by their aid and comfort.

The Jewett maps, the most excellent yet published, aided us materially during these voyages, and a constant use of them contributed much toward a more accurate conception of the geographical localities examined, and as an indispensable reference they proved to be a valuable source of information.

The expedition of 1895 was organized with the aid of the late Mr. Alfred J. Hill, as my associate, Professor Lewis representing Mr. Hill during the continuance of our explorations.

The Art Engraving Company of St. Paul is entitled to credit for their painstaking interest in preparing the illustrations portrayed, which constitute the principal feature of this communication.

J. V. B.

St. Paul, Minn., July, 1895.



OJIBWAY INDIANS MOVING CAMP

At Leech Lake, Minnesota.



THE MOST NORTHERN ISLAND IN THE MISSISSIPPI.

Between Bemidji and Tascodiac Lakes.



SKETCH MAP OF SCHOOLCRAFT ISLAND,
Itasca Lake, Minnesota.



BROWER'S CAMP AT PIKE BAY,
Cass Lake, Minn.



PREHISTORIC VILLAGE SITE AT THE SOUTH END OF PIKE BAY.
(Looking East.)



OAK TABLET AT ITASCA.

§ 1. PRELIMINARY REFERENCES.

At pages 123 and 124, Vol. VII., Minnesota Historical Collections, prepared and submitted by me in 1889-93, the following appears:

Concerning the presumable fact, that, antedating the first known visit of white men at Lac La Biche, French voyageurs may have reached the basin, no reliable statement in writing is known to exist describing such visit. In the absence of any known record as to the movements of the French fur traders and voyageurs who first established themselves in lines of trade and traffic with the Indians across the northern portion of the territory which now constitutes the State of Minnesota, no definite record can be found concerning a mere probability that they may have reached Elk lake. To the writers of the future must be left the task of discovering the record of the manner in which "Lac La Biche" first became known to the French and of any visits they may have made to the locality, if any such record exists, which now seems doubtful. Certain it is that Mr. Morrison's letter is the only record of the first visit to the source of the Mississippi of which we have any knowledge.

Upon page 16 of my report to his Excellency the Governor of Minnesota, for the two years ending Dec. 1, 1894, the following tabulated historical record of the descent of title by possession appears:

Briefly stated, the actual possession of the Itasca basin may be approximately given as follows:

| | |
|--|--|
| Pre-glacial ages..... | Possibly palæolithic man. |
| The Glacial period..... | Possibly an Esquimaux occupancy. |
| Post-glacial period..... | The Mound-Builders. |
| The succeeding occupancy..... | The Sioux Indians. |
| The Columbian period..... | The Spanish. |
| Post-Columbian period..... | The French and English. |
| The seventeenth or eighteenth century..... | The Ojibway Indians. |
| The eighteenth century..... | The Federal Republic. |
| Feb. 22, 1855..... | Ceded, by treaty between the United States and the Ojibway Indians. |
| 1876-1891..... | Surveyed by the government and open to pioneer settlement; Peter Turnbull and family and others. |
| 1891..... | Set apart by law and dedicated as a public park forever. |

Before describing the manner in which a recent discovery of the unmistakable remains of an extinct village of Mound-Builders was made near the geographical centre of North America, a few preliminary references may be presented.

The writer disclaims any special or exhaustive knowledge in the field of archæological research, and presents the results of a very interesting and instructive discovery from the standpoint of a general desire to formulate ascertained facts for the benefit of those who cherish the advancement of scientific knowledge. It is impossible for the meditative explorer, grasping after a larger and more extended information, not to consider, so far as visible indications will permit, the existence, appearance, condition and habits of a people long since extinct, with whose relics, remnants, shell heaps,



CHIEF I-AWE-SHOWE-WE-KE-SHIG. (Crossing Sky.)
Cass Lake Band.

Reproduced by permission of Mr. Peter Sutherland.

workshops, mounds, pottery and remains he has been brought into immediate contact while prosecuting geographical explorations.

The years gone by placed me between two fiercely contending tribes of North American Indians, at savage and blood-thirsty warfare, when tomahawks at the belt, paint, feathers and the scalplock braided from the top of the head constituted important preliminaries to the fierce struggles between wily warriors of the Sioux and Ojibway races.

Later on, during the Sioux outbreak of 1862 and the Indian war that followed, with my companions-at-arms, when we met the fierce Dakotas face to face, for supremacy or extermination,¹ the actual observance and participation then had accentuates an opinion now entertained, that probably the prehistoric race of men who occupied the upper waters of the Mississippi river basin were not extraordinarily different from the nations and tribes now receding before the enlightened encroachments of the English-speaking people. Time has brought its exorbitant and remarkable changes, and, making due allowance for the doubts engendered by the lapse of past ages, the cautious explorer, with some knowledge of aboriginal tribes, can intelligently study the relics and remains described in the following pages, written only because we now first certainly know that prehistoric man penetrated the wilderness of North America to the limit of the great continental water-



VIEW OF THE MISSISSIPPI,
Near Mouth of Wakomiti Creek.

shed whence flow the precipitated waters, returning to the Atlantic through the delta of the Mississippi, the Gulf of the St. Lawrence and the Bay of Hudson; debouchures separated by distances not comparable with any other of a like hydrographic reference or geographical importance in the western hemisphere, if, indeed, in the whole world.

1. General Sibley's expedition in 1863 from Fort Ridgely, on the Minnesota river to Fort Abercrombie (recently abandoned), on the Red River of the North, about thirty miles south from the city of Fargo, N. D., thence to the Missouri river, where the city of Bismarck, capital of North Dakota, is now located. This expedition drove the Sioux across the Missouri, above the mouth of Apple creek, one of the results of the Sioux warfare against the white inhabitants of Minnesota in 1862.

§ 2. THE DICKENSON MOUNDS.

Archæologists and historians have quite fully made known the existence of man in the Valley of the Mississippi at a very early and unknown date.



EXCAVATING A MOUND.

Mounds situated at St. Paul, Minn., and along many branches of the Upper Mississippi have long been known and fully described. Prof. T. H. Lewis has prosecuted investigations farther to the northward in the valley of the main river than perhaps any other professional archæologist. In all these well-known writings I fail to find any mention or description of the Dickenson mounds or earthworks, situated at Park Rapids, Minn., about twenty miles south-eastwardly from Itasca lake. I had the pleasure of excavating a mound of this group in July, 1894, with the assistance of Dr. P. D. Winship. The unmistakable signs

of the hand of man are visible in their construction, but our cursory examination did not develop nor determine their true character unless they were one time a work for defense or for a place of burial, and a further and more extended examination is necessary to determine the true origin of these twenty-two mounds of different sizes and heights. Persistent denudation with the plough and harrow upon Mr. Dickenson's farm has made little progress toward an intended annihilation of this group. We were unable to discover any prehistoric relics or the remains of the dead.

§ 3. A VOYAGE OF DISCOVERY DOWN THE MISSISSIPPI RIVER
FROM ITASCA LAKE.

At the time the Dickenson mounds were examined arrangements had been completed with Rev. T. M. Shanafelt, D. D., of South Dakota, and Rev. S. Hall Young of Iowa, for a voyage from Itasca lake to St. Paul, down the channel of the Mississippi, a distance of nearly six hundred miles. We remained at Itasca lake during the first week of August, in the

full enjoyment of the superb and picturesque landscape scenery, then portaged six miles to the northward by team to avoid the Ka-Ka-Bi-Kons rapids,² and launching our Klinker-built boat, with a commissary supply in a convenient lighter, we



A WINNIBIGOSHISH INDIAN.

sped on our way with unvarying success through the magnificent scenery, camping at the bluffs and enjoying the evergreens, extensive savannas³ and tributary streams and lakes, until we encamped a week later at the remote and picturesque Lake Bemidji, called by the native Ojibway, Bem-e-jig-u-mag, meaning "The current of the river crosses the lake."

Here we were suddenly made aware of geographical subdivisions of the upper basin of the Mississippi, for out from Bemidji lake the waters of the river soon plunge over a series of rapids, formed by glacial boulders, for a distance of twelve miles. So we know now, in addition to our Itasca basin, we also have a Bemidji basin,

and lower down the main river, the Winnibigoshish and Cass lake basin, also the basin above the Pokegama;⁴ these last two distinct basins constituting a division at the Winnibigoshish reservoir dam,⁵ an artificial separation of the waters of that region. Speedily approaching the magnificent and island-dotted body of water named after Gen. Lewis Cass, the statesman and ambassador, we encamped at the old Northwest company trading post of a hundred years ago, at the mouth of Turtle river. There is not a vestige of this old post left, save only decaying emblems of disappearing and abandoned graves.

2. The first rapids on the Mississippi river north of Itasca lake, five or six miles distant by the channel of the river.

3. Remarkable meadows of grass.

4. The Falls of Pokegama, where the river plunges over a ledge of rock in place, as it issues out from the upper or headwater basin of the Mississippi which has been geographically known for many years and which contains about five thousand square miles and a thousand rivers and lakes of different sizes. This extensive headwater basin is hydrographically divided in the manner stated in the text. Leech lake on the south and Turtle lake on the north side of the main basin contribute a perennial flowage through streams bearing the same designations as the two lakes named.

5. Constructed by the government of the United States for a reserve supply of water during the navigable season of the year, from St. Paul to the mouth of the Mississippi. This dam, and other similar ones in remote localities, are used to hold back precipitated waters in artificial reservoirs until about the 1st of August of each year, when the gates are raised and the flood of water replenishes the navigable channel of the river several feet in depth for hundreds of miles.

That was a proper place for a painted and inscribed historical tablet, and we made it of oak.

A beautiful body of water next west from Cass lake, through the south end of which the Mississippi takes its course, I have designated Lake Elliott Coues, in honor of the distinguished gentleman whose scientific labors, with others, gave to the world the "Century Dictionary." Meeting him on the turbulent waters of Winnibigoshish lake, he stemmed the currents of the rapids and river to its source, and I gave his name to the lake, a simple tribute to persistent labors in the field of scientific research. Then we camped for a Sabbath rest at the Winnibigoshish reservoir dam, after having made



THE WINNIBIGOSHISH RESERVOIR DAM.

numerous and friendly acquaintances among the different bands of Ojibway Indians residing along the course of our voyage.

§ 4. THE MOUND-BUILDERS' HOME AT WINNIBIGOSHISH NEAR
THE CUT FOOT SIOUX AND AT ITASCA LAKE.

Near our camp at the Winnibigoshish dam the ancient landmarks of prehistoric man appeared in abundance. Their burial mounds are situated on either side of the Mississippi at the lower extremity of the lake, which is near the peculiar waters of the Cut Foot Sioux, from which, by a portage of scarcely one mile, the waters of the Bow String, at the head of the Big Fork river, are reached. These last named waters flow to the Lake of the Woods, and as it is known that prehistoric evidences of man exist on the banks of the Big Fork river, it is reasonable to presume that the portage from the Cut Foot Sioux to the Bow String and Big Fork was known

and probably discovered by the Mound-Builders centuries before the aggressive Ojibway drove out the Sioux. The death and scalp of a Sioux warrior, killed in battle, who had lost a part of both feet, gave the unique name of "Cut Foot Sioux." A careful examination near the Winnibigoshish mounds brought to light the evidences of a former village site in that immediate neighborhood. The construction of the reservoir dam by the United States government had nearly obliterated one large mound, and the remaining sands, without great effort, gave forth very interesting translucent jasper and quartz spear-heads, arrow-points, mouldering skulls and bones, and quite a double handful of human teeth in a fair state of preservation could have been collected. A half mile up the west-



AN OJIBWAY LODGE.

ern shore, near other mounds, I gathered numerous specimens of broken pottery of different moulds and colors. All the indications point to this place as being formerly a permanent rendezvous of these lost people.

Proceeding upon our very interesting and instructive voyage, other relics of the Mound-Builders were examined, notably those at Sandy lake, where copper spears and other useful and ornamental articles have been found many feet below the present natural surface of the earth. These are the waters so extensively used by the French and English, and later by the Americans, in portaging from the waters of the Great Lakes to the waters of the Mississippi.⁶ It may well be con-

6. This great portage was accomplished by passing up the St. Louis river to the Dalles, thence by land to one of the several rivers, a few miles to the westward, flowing into Sandy lake, which is scarcely a half mile east of the Mississippi river, and connected therewith by a channel of unusual depth. The St. Louis river is the most central and direct upper branch of the St. Lawrence river, the main stream of a hydrographic system, which includes the great fresh-water seas of North America.

sidered as more than probable that the Mound-Builders were the first to discover and utilize this great portage from the basin of the St. Lawrence to the basin of the Mississippi, and the Ojibways came after them in their encroachments, which finally drove out the Sioux, who were the succeeding race of men after the disappearance of the mound-building people.

On the south shore of Sandy lake are visible the old landmarks of the trading post and station of a hundred years ago



CHIEF PUG-O-NA-GE-SHICK. (Hole-In-the-Day.)

Reproduced by permission of Mr. Peter Sutherland.

A consummate savage, who undertook to lead his warriors against the people of Minnesota in 1862. He was shot by one of his own tribe.

which Lieut. Z. M. Pike so carefully described in his report of the voyage of 1805-6 up the Mississippi, during the administration of President Jefferson.⁷ It is now an abandoned waste, soon to be obliterated farther by the flood from the government reservoir dam about to be completed. Two miles away

7. Dr. Coues will, in his new "Pike," soon to be issued and published by Francis P. Harper of New York, describe very fully the cause and results of the Pike expedition up the Mississippi.

we found the site of the post and station occupied by the Americans upon the acquirement of Louisiana from Napoleon Bonaparte, with the acquiescence of the English government. This old post and stockade was situated upon the east bank of the Mississippi, and the well-preserved extremities of the timbers used can be excavated from below the surface of the earth, silent, inanimate reminders of the activities of the eighteenth century in maintaining traffic facilities with the tribes in the then Far West.⁸



CHIEF QUE-WE-SANS-ISH. (Bad Boy.)

Gull Lake Band.

Reproduced by permission of Mr. Peter Sutherland.

One of the most honorable men ever born upon American soil. He thwarted Hole-in-the-Day in his designs against the whites in 1862, taking refuge in Fort Ripley to save his own life. The writer of this report was a hunting companion of Bad Boy's in 1864-67. He died from the effects of injuries received in an encounter with a bear. His son Wadena and his daughter Ne-Na reside at White Earth, Minn.

Indians are often named after some trifling event or act occurring during childhood. I never learned from Bad Boy why he was so named, and it is probable that he lost sight of or forgot the circumstance of his younger years which gave him this designation. He resided at Round Prairie, Todd county, Minn., for many years, during the summer season, and was implicitly trusted as an "honest Indian."

After having been joined by Dr. G. R. Metcalf and his son at Winnibigoshish (most agreeable companions), our voyage was continued down the river and brought to an end.

Soon afterward a return overland journey to the source of the Mississippi was accomplished. On my return to Itasca

8. Ojibways, Sioux, Mandans, Assinibolnes, and other tribes and bands occupying the plains and territory from the Upper Mississippi west to the base of the Rocky Mountains.

lake, I was firmly of the opinion that it had been discovered by prehistoric man; yet years of casual examinations, from time to time, since and including 1888, had failed to bring to light any of the relics or landmarks of these lost people in that locality. These casual examinations had been made at the request of a distinguished geographical and historic writer, the late Mr. Alfred J. Hill, with no success whatever. It was now determined to commence a studied and careful explora-



GAY-GWED-O-SAY. (Trying-to-Walk.)

Jean Nicolle's Guide to Itasca Lake in 1836.

(Died at the age of 115 years.)

Reproduced by permission of Rev. J. A. Gilfillan.

tion of the shores of Itasca lake for evidences of the existence there of man in the past ages. All the conveniences necessary for a two months' sojourn were provided, and the protection of the interests of the commonwealth against marauders at the state park gave the coveted opportunity to search thor-

oughly for some clue to proceed by and follow up. The success of this determination and the results which followed were surprising. The hydrographic and topographic surveys made on behalf of the State of Minnesota and its State Historical Society had been conducted under my personal supervision and direction, and I knew the locality better, probably, than any person of the present generation. At the time the final state park chart of 1892 was completed the words, "Earliest probable occupants, prehistoric," had been placed as a footnote in the legendary description, for it was at that time surmised that some day the opinion then entertained, which was the only basis for this legendary information, would prove to be well founded.

The night of the 26th day of October, 1894, the little animal, locally known as the pocket-gopher, which never sees the light of day except while throwing up in its peculiar way the surplus earth from its burrowings in little miniature mounds above the surface, made several of these well-known and peculiar mound markings a few feet above the surface of the water in Itasca lake on the east shore of the north arm, half way between McMullen's cabin, where I was encamped, and Patterson's old cabin, a quarter of a mile to the northwestward towards the outlet of the lake. On the morning of the 27th I discovered an unmistakable pottery remnant, which had been thrown up by this little pocket-gopher. This remnant of pottery bore several of the well-known markings of prehistoric man, peculiar to his residence in the Valley of the Mississippi. Thus the little mound-builder with his pouches, one on either side of the neck, extending from near the jaw down to near the shoulder, which we here designate by the very correct descriptive appellation of pocket-gopher, unconsciously brought to light the existence of the ancient mound-builder of more formidable portentousness and who preceded this particular one by many centuries at the source of the Mississippi.

Now commenced a careful examination of the whole locality for further evidences, if such existed. First, a grooved stone hammer was found, then several additional pieces of pottery came to light in the stratum of the cultivated field belonging to Mr. McMullen, and on the 1st day of November Mr. F. J. Steinmetz came to my assistance and we prosecuted the search in earnest. A very old flint arrow-head came to light from the stratum near Patterson's old cabin; then two stone knives with well-defined and symmetrically chipped edges were unearthed in the immediate vicinity, and numerous pieces of broken pottery, of various unique and characteristic moulds, thrown up by the plough, hoe and spade, were added to our collection; then, not the least, by any means, a copper disk rewarded our patient search, soon after which followed a discovery of the

unmistakable signs of a workshop, where were gathered the translucent and crypto-crystalline spalls struck from the prehistoric spear and arrow heads as they were made upon the shores of Itasca lake, and further over towards the outlet the white earth and decaying remnants of a shell-heap, long since covered by the mould and debris of ages, was definitely located on a point of ground above the surface of the lake. The plough-share had thrown some of these decayed shells to the surface. After a systematic examination, it was concluded that a former village of Mound-Builders, nearly or quite one-half a mile in length, had been established and maintained in the Itasca region, in north latitude $47^{\circ} 14' 15''$, longitude $95^{\circ} 11' 41''$ west



CHIEF BE-SHECK-KEE. (Buffalo.)

Leech Lake Band.

Reproduced by permission of Mr. Peter Sutherland.

Helped to thwart the designs of Hole-in-the-Day, in 1862, against the white settlements of Minnesota. Orator, and held a medal from King George III.

from Greenwich. From all indications it would appear that the cacique occupied the southeastern limit of the village, the better members, or head men, the centre, and the lesser or poorer class the west end and flats there situated. This good guess, it is hoped, is very near the facts, for all of the better specimens and finer moulded articles appear at this supposed cacique's end of the village, the substantial mementoes came

from the middle ground, and every piece or relic found at the westerly end was rough, poorly marked and of undoubtedly a skimp manner of making, indicating mediocre ability to finely mould. The chert and quartz and the copper unfold a remarkable and wonderful narrative of the geographical ability of these lost people. That they were geographers of no mean ability, courageous and mentally competent and able, can easily be surmised from these unmistakable evidences of their having penetrated to the heart of an unknown continent, without any subsistence, presumably, save only the results of their own ability to gain from a massive, unknown and dense wilderness. It was nearly three hundred years from the time the Missis-



DA-DODGE-GE.

A Medicine Man.

Reproduced by permission of Rev. J. A. Gilfillan.

sippi river was known to exist by Europeans until Schoolcraft, in 1832, discovered and named Itasca lake. This lost village upon this spot was maintained at a time since which the sands of the earth and the mould of ages, with varying winds and storms and seasons, have accumulated over these deposited relics several inches, from no other than natural causes and at the summit of sloping ground. A forest of heavy timber has long since disappeared, leaving only the distinguishable evidences of where massive pines once stood. The copper, quartz and chert were undoubtedly obtained from the neighborhood of Lake Superior and other remote localities. Nothing whatever except the imperishable relics and the skeletons of this lost race of men remain, and they had only their hands

and their wits by which to maintain themselves and their families in this solitude. I for one take the greatest interest in these remarkable people, who first penetrated to, and probably originally discovered, the source of the Mississippi. That they knew every hill and valley, lake and stream, at the Itasca basin, is shown by this extinct settlement of the dead, maintained previous to the origin of the North American Indian as found by European voyageurs. Snow and ice put a stop to these explorations by the middle of November, but the collection of relics induces considerations and imaginations concerning these ancient people and their ability which can and will be augmented by a continuation of this fruitful and interesting search for more of these extant and imperishable evidences. Much remains to be unearthed. The whole course of the Mississippi river was occupied by these or similar tribes of men of ancient times. The name by which they knew this great river, their language, religious ideas, marital habits, color, origin, much of their manners and taste, and the true appearance and construction of their lodges in this northern region, the mode of communication with other and distant villages, the habits of the chase, and all those personal characteristics necessarily peculiar to this race of men, must forever remain unknown, except in so far as we may be able to draw inferences, form opinions and arrive at conclusions after this whole western country shall have been searched for a more complete knowledge concerning these lost people, and then much must necessarily remain in the darkness of oblivion. Whence did they depart and what became of them? Who came after them and whence are these later people disappearing? The answer of this last question is nearer a solution than can possibly be claimed for the former.

§ 5. THE DAKOTAS AND THE OJIBWAYS.

M. Groseilliers and M. Radisson, two Frenchmen of energetic habits but apparently illiterate minds, about two hundred and thirty-four years ago, passing west from Lake Superior, came in contact with the Sioux or Dakotas, and as it is quite certain that these two first Europeans reached and crossed the Mississippi some thirty or forty miles above the present site of the city of St. Paul,⁹ the gradual retirement of the Sioux before the aggressive Ojibway can be fairly traced from the happenings subsequent to that time. There is little doubt but that the two Frenchmen named, who at one time carried on their explorations under British auspices, were the first Europeans who came in contact with the Sioux tribes.

9. Thirteen miles, by the channel of the Mississippi, below the Falls of St. Anthony of Padua, discovered and named by Hennepin.

They then lived in great numbers in the territory which afterward fell into the hands of their mortal enemies. While the full facts are not known, it is probable that the Sioux then occupied the entire waters of the Mississippi, from the region of the St. Croix to the source of the river, a distance of more than six hundred miles, with the adjacent country literally swarming with buffalo, elk, deer, bear and beaver, upon which they subsisted in comparative comfort. They do not know their own origin, and their legends scarcely indicate the facts of their migration to the source of the Mississippi. Whether they were the first to follow the Mound-Builders seems to remain a mystery. However, they came into possession of the country west from the extremity of Lake Superior, and remained there until they were, by force of arms, driven out by the Ojibways.



A CANOE AND OJIBWAYS.

These later Indians considered themselves "spontaneous man" (An-ish-in-aub-ag). Their traditions, according to a learned writer of their own people, Hon. Wm. W. Warren, a mixed-blood, indicate that the meaning of the word is "Ojib," to pucker up, and "Ub-way," to roast. "To roast till puckered up." This seems to come from the manner in which they roasted their enemies until they puckered up. Another interpretation is the manner in which they pucker up their moccasins in seams below the instep. Mr. Warren intimates that they may have descended from one of the lost tribes of Israel, suggesting Hebrew extraction, and their first known residence was not far from the mouth of the St. Lawrence, on the coast of the Atlantic. Their migration westward necessarily covered centuries, for, tarrying a long time in the neighborhood of the outlet of Lake Superior, they afterward resided upon the Island of La Point for over a hundred years, near the Bay of Sha-ga-waum-ik-oug (Chaquamegon Bay, Lake Superior). Here their

extensive rendezvous, located upon an island to escape the onslaught of their warring enemies, at a time when firearms were unknown to them, was broken up by cannibalism among themselves, and the numerous clans of the tribe scattered in different directions. Coming into the use of firearms, they pressed their warfare against the Sioux until they came into possession



WHITE CLOUD, HEAD CHIEF OF THE OJIBWAYS.

White Earth, Minn.

Reproduced by permission of Rev J. A. Gillilan.

by force of arms of the entire upper waters of the Mississippi north of the mouth of Watab river, immediately above Sauk Rapids, Minn., and a large area in the valley of the Red River of the North. This war of unknown duration almost transformed certain habits of the Sioux, for they departed permanently from the timbered localities near Mille Lac, Sandy and Leech lakes, and soon became a people of the treeless plains, reaching from the valley of the Minnesota river to and across the basin of the Missouri in South and North Dakota, using ponies for transportation purposes,¹⁰ while the Ojibways made

use of the bark canoe and pack-strap until very recent years. This remarkable history of the Sioux and Ojibways, if given in detail, would fill volumes. The last war party between these contending tribes of which I remember was of the Sioux in 1860, from the valley of the Minnesota river to Crow Wing river. For considerations of vital importance, a full description of which is dispensable in an article of this kind, these Indians



MA-KONS. (Bear's Cub.)

Queen of the Pillagers. Daughter of Flat Mouth.
Cass Lake, Minn.

10. While preparing for a desultory march, the Sioux Indians, who occupied the treeless plains for so long a period, fastened two long lodge poles to either side of a mustang pony with long bushy tail, one end of the pole resting against the shoulder of the animal and the other on the ground, from six to eight feet in the rear of the pony. These poles were fastened by broad straps made from buffalo or elk skin used as breast straps, and crosswise at the rear end of the lodge poles were fastened two shorter poles, forming a square frame. To this frame would be fastened the skin of a buffalo, usually in rawhide form, which completed a unique, ingenious means of transportation impossible to upset in the rugged passages of the wild west. Loading dried meat, pemican, cooking vessels, blankets, papooses, etc., in this square frame of poles and rawhide fastened to an unruly pony, without bridle, driver or harness, the whole was turned loose as being ready for the march. The women of the band, invariably designated by the euphonious appellation of "squaw," attended these ponies on foot. As a rule they were poorly dressed, wearing moccasins without stockings, short garments, leggings of cloth or leather made from skins, bareheaded, with long, black braids of coarse hair reaching down the back, usually a calico waist and short skirt, and during inclement weather a square blanket for a wrap and hood, which, when thrown over the head and wrapped around the arms and body, would leave only the face and feet protruding. These women were the laborers and servants of their husbands and masters. An Indian seldom pitches camp, loads the pony, cuts fuel or carries water, when the squaw, wife and mother accompanies the moving band. With a painted feather in his hair for each scalp taken, the best pony of the herd, with skin saddle, decorated with colored beads, stirrups of rawhide or thongs and a bridle made from elk skin: bowie knife, scabbard, gun, pipe and kinnikinnie—the pipe of stone similar to the one held in White Cloud's hand (see portrait), and the kinnikinnie, gathered from the bark of the red willow, held in a beaded tobacco pouch—with punk and the accompanying flint and steel with which to strike fire (the steel in the right hand and the flint and punk held tightly with the forefinger and thumb of the left hand, when in use); a calico shirt; no hat or cap; leggings fastened from above

of both tribes are disappearing from the face of the earth. Warfare, immoral habits, small-pox, the inebriate's weakness, consumption and miscellaneous degenerating influences have depleted their ranks to an extent which makes the final result concisely rapid and silently sure. There are reasons why they should still continue to regard the white man as a mortal enemy.



NE-TA-WISH-KU-MO QUE. (She-is-an-Expert-Woman.)
Daughter of Ozawindib.
Schoolcraft's Guide, 1832.

the knee to the belt, which carries the knife, tomahawk, etc.; a breech-clout, over which loosely hangs the calico shirt; beaded moccasins and a blanket (usually white or green in color), and a miscellaneous outfit of trappings, ammunition for the chase, painted faces, vermillion on the hair where it is parted in the middle, gaudy ornaments of a cheap variety, braided hair, no beard, a skin that is nearer black than it is red; thus mounted he marches a prince of the plains, ready for war, the dance, the hunt, the leisurely smoke, his dally decorations, but never the degrading, despicable labor of the camp. The striking appearance of a band of Sioux Indians marching in the manner described can only be adequately understood and appreciated by those who have witnessed these actual scenes in the years gone by, for now these Dakotas are no longer roaming nomads, but are housed on reservations in the Missouri valley and fed by the government.

The Ojibways are but little different, save only they were a people of the woods, using birch-bark canoes, traversing the numerous water courses, portaging by the use of the pack-strap, made from the thick heavy skin from the leg of the moose, by which means, his bark canoe, bottom up, balanced over the top of his head, with the bow of the canoe sufficiently elevated to permit him to look forward under it, was carried from lake to lake and from river to river. The squaws, by the same kind of pack-strap carried upon their backs, balanced from the top of the head, the camping outfit, cooking utensils and paraphernalia, with the papoose strapped on top of the whole, face to the rear, in a frame to which it is tightly bound. The canoe carried by the braves weighed about fifty pounds, while the load carried by the women often weighed three hundred pounds. Their portages were never very long, but in the winter season their marches upon snow-shoes were often a hundred miles or more. Of recent years these Indians are housed upon reservations, and have teams and wagons furnished by the government. The former appearance of the Ojibways on their marches was no less striking, though different, from the Sioux in the manner described in this brief note.

There are two known destinies: the disappearance of the Mound-Builders and the disappearing Indian tribes of the upper basin of the Mississippi, for the second and third race of man¹¹ known to occupy and inhabit the upper basin of the Great River are following in the footprints of their one known predecessor in an assured disappearance, unless all signs fail, and the pale-face—"Not Frenchman, nor English, but white Indians"¹²—are now the active, ambitious, energetic occupants of the entire basin of the greatest river system of the world, with the simple exception of isolated reservations,¹³ and most of these will soon be possessed by a hardy pioneer people.¹⁴



OJIBWAY GRAVES,

At Leech Lake, Minn.

11. The Sioux and the Ojibway tribes, distinctly separate, but probably of nearly or quite the same very remote origin.

12. Lieut. Z. M. Pike and his soldiers, in 1806, were designated by the Ojibways "White Indians," because they were neither Frenchmen nor Englishmen, as was usual in those days, but of that American nation of men to whose existence the attention of the Ojibways had not theretofore been attentively directed prior to Pike's visit to them.

13. All Indian reservations in Northern Minnesota are Ojibway, and all in the Dakota states are Sioux, excepting the Turtle Mountain reserve. Several of the Ojibway reservations have been transferred to the public domain by congressional enactment, and the Indians ordered removed to White Earth as a permanent place of abode. The former policy of the government of the United States in dealing with these Indians was by formal treaty, but recently a change has been inaugurated, suggested, I think, by the late Gen. B. F. Butler, whereby the authorities of the United States no longer consider the Indians a proper people to treat with.

14. Citizens of the United States, among whom are a considerable number of Scandinavian, Danish, Finnish, German, Polish, and other people, emigrants from the shores of Europe, a well-to-do class as a whole, honest, industrious and capable of exercising the rights of freemen under a government in the temperate zone, the brightest and ablest men of which were born and reared in log cabins. By a reference to any chart showing correct geographical positions, comparable with statistical results, it will be noticed that the central intensity of the north temperate zone encircles the earth immediately in the neighborhood of the Great Lakes in the western hemisphere, where ample elevation above the sea level, pure air and water, wholesome food, and the consequent activity and development of the mind and body, produce a race of men as yet unsurpassed.

—Recently, Rev. J. A. Gilfillan, for more than twenty years a missionary, under Bishop H. B. Whipple, among the Ojibways, forwarded to me an interesting collection of Indian photographs, from which has been prepared copies of the portraits of White Cloud, the head chief at White Earth, Gay-gwed-o-say, a noted guide, recently deceased, and Da-dod-ge, a medicine man, which, in connection with nearly two hundred photographic views of my own, of different sizes and varieties, many of which are reproduced and given herewith, constitute a valuable ethnological and scenic album of rare and un-



A SIOUX BURIAL.

Reproduced by permission of Dr. E. S. Hart.

usual interest, which is augmented by the contribution of Mr. Peter Sutherland, coming as they do from nature's original representations of actual scenes and circumstances observable at and near the ultimate source of the main river in the great watershed occupied in ancient times by the prehistoric people we know so little about.

These climatic and hygienic influences soon transform the languid emigrant into an energetic citizen. To this same influence I attribute the success of prehistoric man in this same locality (the basin of the Mississippi), in energetically pushing forward for a more extended geographical knowledge, until he built and maintained a town at the very source of the river, in the exercise of the laws of existence, showing a knowledge of latitude and departure, exceeded only by the use of scientific instruments of a more modern advantage. There

With considerations of exalted respect for the purposes of the Manchester Society, its officers and members, this inadequate descriptive paper and the enclosed sketch-map and illustrations, which may prove of some interest, is submitted, accompanied separately by an official map of the State of Minnesota and an official map of the United States of America, the latter showing portions of the Dominion of Canada, Cuba, a part of Mexico and Yucatan, and the Territory of Alaska, which, with a continuation showing the results of my 1895 expedition, will give some light upon the questions discussed.



SCENE AMONG THE ELLIOTT COUES' LAKE INDIANS.

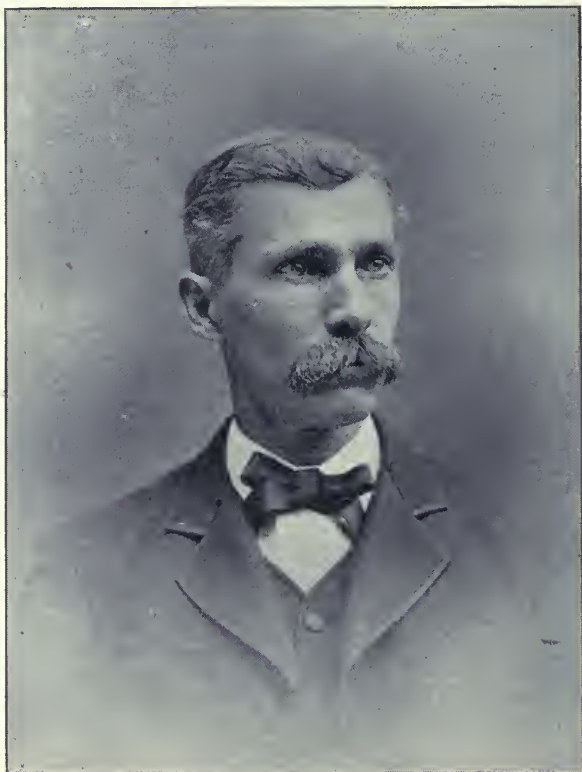
is little or no doubt in my mind that the remarkable progress of the American people and the wonderful strides made by them toward a revolution in scientific research and invention come from this intensity of the temperate zone in its capacity to enlarge, expand, enhance and characterize brain formation at geographical positions where the greatest power of the sun's rays is intensified by other and consequent subsidiary influences; for certain it is that the arctic and the tropic zones have produced no such transformation in the world's history as has the federal republic in this temperate hemisphere in but little more than a century of time. Then it is reasonable to presume that the Mound-Builders, in their physical and mental capacity, were intensified by the same climatic influences which gave them the energy to discover the source of the Mississippi, of which fact we are now made aware, as a result of this recent and very interesting exploration.



MODERN INDIAN PIPE.

Of Red Pipe Stone, in Three Pieces.

[Note.—This pipe is made of material taken from the Catlinite quarry situated at Pipestone, Minnesota. The Red Rock of the Upper Missouri basin, sometimes used for pipe-making, is similar, but not identical.]



THE LATE MR. ALFRED J. HILL.



PROF. T. H. LEWIS.

Portrait of the Gentleman who Represented Mr. Hill During the Voyage of 1895.

§ 6. RESULTS OF THE EXPEDITION OF 1895.

The close of the year 1894 witnessed the new discoveries related in the preceding pages of this communication. The relics and remains of the Mound-Builders at Winnibigoshish and at Itasca lakes, apparently deposited at about the same period of time, left no doubt of a more extended occupancy between the two points named, adjacent to the numerous lakes and streams which extend throughout the upper watershed of the Mississippi.

It was toward a solution of this latter problem that I gave my attention at the beginning of the present year. In the month of February last the late Mr. Alfred J. Hill again became my associate, preparatory to a more extended and systematic exploration of the different positions between and adjacent to the localities named, a distance by the channel of the river of a little more than one hundred and thirteen miles.



VOYAGING ACROSS LEECH LAKE.

All preparations necessary for this third voyage of discovery were made by myself, and Mr. Hill delegated his proportion of the work to the able hands of Prof. T. H. Lewis, who became an equal party to these new explorations at our joint request, Mr. Hill himself having determined that he could not personally accompany me. The movements of the party during the time occupied are here given in a narrative description of the explorations and discoveries made. There seems to be no necessity for any distinction between the particular facts discovered by Professor Lewis or myself, for upon every hand we jointly or separately brought to light a most remarkable and deeply interesting list of discoveries connected with and bearing upon the occupation of the entire upper basin of the Mississippi by prehistoric man.

The expedition proceeded to Park Rapids, Minn., with a very complete supply of surveying instruments, maps, charts, camera, government plats, one boat and lighter, and all necessary provisions and apparel for a two months' voyage in the north-

ern wilderness. It was on the 27th day of April, 1895, that a further and rather cursory examination was made of the Dickenson mounds, situated upon the south side of section 14, township 140, range 35, one mile north of Park Rapids, Minn. We counted in this group twenty-two various mounds and embankments, of different sizes and heights. These ancient works are situated southwestwardly from the outlet of Fishhook lake, and less than one mile distant therefrom. There are slight indications of a village site of Mound-Builders on the south side of the lake near these mounds, and at the farmhouse of Mr. Phipps are two other mounds, near the west end of the lake. Chipped spear-heads and arrow-points of stone were exhibited by Mr. Phipps, a collection gathered in his field, which discloses to a certainty that the mounds near Fishhook lake and the Dickenson mounds and earthworks were constructed by the



EXCAVATING THE LEWIS MOUNDS.

At Itasca Lake.

prehistoric mound-building race. No detailed survey of these earthworks has been made. On the evening of the 28th of April the members of this expedition established an encampment at McMullen's, on the north end of Itasca lake, and until the 5th of May explored, from day to day, the entire surroundings of the prehistoric village site discovered by me the previous October. Numerous arrow-points of stone, pottery shards, spalls and chipped stone implements were found on both sides of the Mississippi and along the east shore of the north arm of Itasca lake, indicating that the former ancient occupancy was more extensive and of greater age than was at first apparent. Our next discovery was the site of an old trading station of former years, date unknown, situated upon Schoolcraft Isl-

and. This old station, unmentioned by any of the earliest explorers, was probably a trading post of the French in early times, and I have referred the matter for some further inquiry to Professor Levasseur of the Department of Public Instruction for France.

A group of burial mounds was discovered upon the fractional east half of the south-west quarter of section 35, township 144, range 36, which I have properly named in honor of my discovering companion. A more detailed description of these mounds follows herewith:

THE LEWIS MOUNDS.

- Mound No. 1. Diameter eighteen feet, height one foot.
- Mound No. 2. Length eighty-three feet, width sixteen feet at the east end, twenty-one feet at the west end, height two and one-half feet.
- Mound No. 3. An elliptical mound, length thirty-eight feet, width twenty-four feet, height three feet.
- Mound No. 4. Diameter seventeen feet, height one and one-half feet.
- Mound No. 5. Length forty-three feet, width sixteen feet at the west end, twenty-four feet at the east end, height two feet, about the shape of an egg cut in two lengthwise, and the half shell turned down.
- Mound No. 6. Diameter twenty-six feet, height three feet.
- Mound No. 7. Diameter twenty-two feet, height three feet.
- Mound No. 8. An elliptical mound, length twenty-eight feet, height two and one-half feet.
- Mound No. 9. Diameter sixteen feet, height two and one-half feet.
- Mound No. 10. An embankment, forty-four feet in length, eighteen feet in width and two and one-half feet in height.

With the assistance of Messrs. Wegmann and Sauer, whom we engaged for the occasion, several of this interesting group of mounds were excavated with the following results:

EXCAVATIONS.

Mound No. 1 was composed of sandy loam. The remains of one or two interments in this mound were fragmentary and useless for scientific comparison.

Mound No. 2 was not excavated.

Mound No. 3—Composed principally of black sandy loam. At the west side of the centre the loam of the original surface had been removed. Resting upon the natural gravel below this excavated loam was a quantity of calcined human bones. Five skulls were recognizable and the fragments of probably as many more were intermixed in this heap of charred remnants. At the north edge of the calcined remains was a well-preserved skull, selected for illustration herein in case the same can be procured in time from Mr. Wegmann, with whom it was left for safe keeping.¹⁵ Just above this

¹⁵ Since received and illustrated in the series presented, and opposite the Tascodlac Skull.

calcined mass of human remains and almost resting upon it were six skulls and various bones, more or less decomposed and broken. Still above these last described remains and near the upper surface of the mound appeared the remains of an intrusive burial of doubtful identity; but since a well-defined covering of birch bark appeared, this latter interment was undoubtedly by Sioux or Ojibway Indians, probably the latter. The remains of this last interment were very much blackened and decomposed, while on the other hand the skulls lower down in this place of burial were natural in color; a comparison in the mode of burial which presents a wide difference. At the east end of the excavation there had been buried the remains of seven persons, but throughout the extent of the excavation there was wanting any evidence of regularity in the mode of burial. In different sections of the mound two small beds of gravelly sand and two of charcoal and ashes were noticed, but no certainly defined existence of fire at the time of burial could be traced. A portion of the bones were calcined.

Mound No. 4—Composed of black sandy loam and contained the disappearing remains of but one person near the bottom of the mound.

Mound No. 5—Composed of a light sandy loam. Near the east end a small pit, five feet in diameter, had been excavated below the original surface about one and one-half feet. From this artificial pit there were taken three skulls and a few bones, very much decayed and broken. At the east end appeared a quantity of debris, consisting in part of broken bones, pottery shards, charcoal and ashes, but the bones were not of human origin.

Mound No. 6—Composed of sandy loam, and contained, apparently, the fragments of two decayed skeletons.

Mound No. 7—Composed of sandy loam. Only one pottery shard was found in this mound.

Mound No. 8—Composed of sand and sandy loam. Two small ash heaps and a few fragments of human remains only were found in this outlying place of burial.

Mound No. 9—Composed of sandy loam. Near the surface were two intrusive burials, male and female, and the same considerations apply to these which appear concerning the upper burials in Mound No. 3. I am of the opinion, however, that these are the remains of Ojibway Indians, buried near the surface, in the flesh, and not, therefore, prepared for a continuous preservation as were the calcined remains of the dead Mound-Builders, interred so long ago in the mound referred to. The other remains in this mound had long since crumbled to dust.

Mound No. 10—Composed in part of a sandy clay and sandy loam. Near the centre of this mound were two skulls and parts of three skeletons. Beyond a trench, about twenty-eight

feet in length, run through the upper part of this place of burial, nothing of interest appeared. The interments were original.

Commencing at the site of the central portion of the Lewis group, and extending to the Mississippi river on the west and to Itasca lake on the south, there appeared numerous stone spalls and pottery shards, indicating beyond doubt a more defined outline of the village site maintained there during the centuries long since passed.

At Point Hill, Itasca lake, named by Dr. Coues in honor of my late distinguished associate, there was discovered one mound twenty-four feet in diameter and two feet in height,



PORTAGING WITH TEAM.

which contained fragments of bone and mussel shell. At the summit of the south end of Point Hill, a remarkable bone heap was excavated, about twenty feet above the surface of the water in the lake. I noticed bones of the moose, bear, deer, wolf, beaver and fox and intermixed therewith were fragments of pottery, stone spalls, hearthstones and triangular arrow-points, indicating the former existence of a small village of Mound-Builders, probably at about the same time that the extensive village on the north end of Itasca lake was maintained. Taking advantage of our sojourn at McMullen's, a large collection of relics was made, illustrated in different portions of this publication and fully explained therewith or elsewhere herein.

On the eighth day after our arrival at Itasca lake, we departed northward by team and boat and camped for the night of the 6th at the Shanafelt Bluffs at section 30, township 145, range 35. On the morning of the 7th our course of departure was down the Mississippi in our comfortable Klinker. Upon arriving at the mouth of Chemaun creek, an examination of the surrounding country was made and the existence of pottery shards at lot 12, section 19, township 145, range 35, was noted. There was also found on the east side of the creek a very old pipe of red pipestone, the identity of which is uncertain. We camped for the night at my former camp



(Trouble), at lot 9, section 5, township 145, range 35. Proceeding on our voyage we camped for the night of May 8th about two miles above the mouth of the Piniddiwin river. The following morning a very cursory examination of the hills bordering upon Manomin lake, through which the Piniddiwin takes its course, revealed meager signs only of the migratory pathway of the Mound-Builders, but enough to satisfy us that they had formerly occupied the premises. Passing down the river, which meanders through the extensive meadows to the eastward, we passed to the first plateau below the mouth of Cow Horn creek and landed for a noon-day lunch at the fractional northwest quarter of section 28, township 146, range 34,

Beltrami county. Here we discovered the evidences of a former large village site of the Mound-Builders on both sides of the Mississippi. Numerous pottery shards, spalls, and one stone scraper were found. A search for the mounds of the locality being unsuccessful we proceeded on our way and camped for the night on the north bank of the river, at lot 1, section 27, township 146, range 34. Proceeding upon our voyage, we discovered numerous evidences at the extensive sand-bank upon section 13, and afterward it was learned that there was a large mound in the same neighborhood. At Carr's field, at the mouth of Naiwa river, where the same unites with the Mississippi, at the fractional south-east quarter of section 20, township 146, range 33, numerous evidences of a large pre-



LOOKING NORTH ACROSS THE MISSISSIPPI.

At the Cow Horn Village Site.

historic village site were selected from the upturned earth in the cultivated field there situated. We voyaged up Naiwa river through the first lake and camped on the east shore of the second handsome body of water, first north from the picturesque Plantagenet, which is the Resting lake of Allen's map. The confusion of names which Dr. Coues so strikingly illustrates for his new "Pike," in a valuable historico-geographical chart, an advance copy of which is open before me at this writing, admonishes me not to undertake the task of unraveling the classified nomenclature of this locality during a consideration of this present subject. On May 11th, with varying winds, we reached an encampment at Benidji lake, on the east bank of the Mississippi, at its entrance into this magnifi-

cent body of water. Our encampment was the site of the encampment of prehistoric man, for on every hand and on either side of the river we gathered promiscuously the relics and remnants of the mound-building race of men, including a perforated cowry shell (*cypraea annulus*). We learned that the mounds of this locality were situated at an eminence west of Lake Irving. I explored the unique geological ridge between lakes Irving and Bemidji, and entertain some reasons for believing that modified mounds are to be found on this ridge, which has been variously occupied by the Ojibways for a hundred years or more. At the outlet of Bemidji lake, on



VIEW ON THE MISSISSIPPI

Above Nalwa River.

both sides of the Mississippi, relics of the Mound-Builders were picked up and a large mound discovered immediately at the outlet on the north bank of the river and east shore of the lake, near the base of a very old oak tree. This mound was partially excavated and found to be of black sandy loam, containing the remains of original interments, only one of which was removed, in a fair state of preservation. In passing down the river the most northerly course of the Mississippi at my camp of the year previous, known as Camp Boutwell, was reached and passed, and the fair stage of water in the river gave us great pleasure in voyaging over and down the numerous rapids extending from the Bemidji outlet to the locality of the Tascodiac. Here I take issue with Dr. Coues, who, in "The Annals of Iowa" for April last, deploras the low water and impassable rapids of this portion of his voyage of

1894. That was a season of drouth, and now this particular portion of the Mississippi is the most romantic and picturesque of the entire upper basin of the river, easy to navigate and interesting to explore. The night of May 13th found us encamped at a limited plateau on the west bank of the river, opposite a small grassy island, about three miles above Tascodiac lake. Pottery shards were found at our landing place. Proceeding on the morning of the 14th, we soon went into camp, on account of rain, at the edge of the Tascodiac meadows and within sight of the lake. Having discovered four extensive effigy mounds, at the summit of the bluff on the north bank of the river, the 15th of May was the time allotted



Nalwa River.

Mississippi River.

VIEW AT CARR'S FIELD.

Site of Prehistoric Village.

to survey and excavate this curious group. Dr. Young, Dr. Shanafelt and myself explored this locality on Monday, Aug. 13, 1894, ascending to the summit of each of these mounds. They seem to have been constructed for some unknown purpose, out of pure sand, and the group contains over one hundred tons of earth. An excavation of the most southerly mound of the group, to the original surface, brought nothing to light bearing upon the question of purpose in the construction of these old earthy effigies. Subsequently the village sites and mounds of prehistoric Tascodiac man were located on both sides of the Mississippi at the outlet of the lake, about a mile distant from and in full view of the Tascodiac effigies. Toward these village sites and mounds we extended a particular investigation. Stone and pottery remnants are promiscuously scattered about, along the sandy beach of the lake, upon lots 6 and 9, section 25, township 146, range 32, at the western

boundary line of the Ojibway reservation. Two large burial mounds are central at the principal village site, on the point of land nearly encompassed by the lake and river, and on the south side several small low mounds appear at the summit of a hillock near an old trail leading from Leech to Red lake. The most southerly mound on the north side of the river was excavated, and disclosed a very interesting state of facts. This mound is forty feet in diameter, three and one-half feet in height, with an approach about two feet in height and thirty-six feet in length extending northwestwardly from the base of the mound. We here exhumed the skulls of twenty persons and portions of twelve others, which, with three additional ones noted at the side of the excavation, made in all



Foot Bridge. Mound. Cabin.

MISSISSIPPI RIVER.

Outlet at Bemidji Lake.

thirty-five within a radius down through the centre of the mound scarcely seven feet in diameter. Other portions of these skeletons appeared in such a promiscuous manner, intermixed in such different and irregular order, that it leaves the cause and manner of this wholesale burial in doubt. Several large boulders were taken from this excavation, placed there by design for some purpose, usually above one or more skulls. From this exhumed collection there is portrayed one particular exhibit which I have designated, for a more definite reference, the Tascodiac skull. The aperture at the centre of the side of this skull has every appearance of as great an age as the skull itself since the unknown date of its burial, and that portion which is missing I have no doubt was, in some manner unknown, removed before burial. That there were

probably upwards of one hundred remains laid to rest in this particular mound seems possible, and the manner of burial with accompanying pottery shards and other prehistoric evidences leaves no room for conjecture as to the identity of the contents of these mounds. They were the builders of the Tascodiac effigies. There are many reasons for determining that they were. Some two hundred and fifty yards northwesterly appears another mound, nearly the same size and circular in form. The use of the steel probe indicated that this mound, like the first, is filled with human remains, but for want of time it was not excavated. Between, around and outside of



SHOOTING THE RAPIDS,
Between Bemidji and Tascodiac,
On the Upper Mississippi.

these mounds were the remnants and debris of a former extensive village. Burned stones, chert, quartz, hornstone and jasper spalls and a few chipped implements were found, and pottery shards variously composed of stone and clay, sand and clay, and shell and clay, lie scattered along the sandy beach of the lake, which is modified somewhat, like the river bank above, by the action of water.

After a night's rest at our encampment on the south side of the river, a mile below, we proceeded down the stream to the Elliott Coues and Cass lake locality. Ojibway villages and settlements are variously scattered along the route from the entrance of the Mississippi into Lake Elliott Coues, thence to the north shore of Cass and Winnibigoshish lakes, to the mouth of the Cut Foot Sioux, something more than thirty miles. At the very inception of our route through and past

these villages and settlements unmistakable evidences of the former mound-building population maintaining a permanent occupancy were observable on every hand, and the little cultivated fields established by the Indians proved what we had suspected, for everywhere were found the pottery shards, stone spalls and chipped implements of the prehistoric age. The Ojibway cemetery at the first Indian village reached, on the left bank of the river, situated upon lot 1, section 30, township 146, range 31, constitute intrusive burials in one or more mounds, and on the opposite bank of the river, a little farther up stream, is a single mound about fifty feet in length and three feet high. There are also indications of artificial earth-works at the summit of a sharp declivity on the opposite side of the lake, north of our place of encampment, which we effected at the west extremity of Cass lake. At and immediately north from this encampment are the indications of the occupancy by man in succeeding ages for at least a thousand years, and possibly a much longer time, for ample evidences of a mound-building population were noticed, the Sioux Indians resided here, a very old trading post was maintained, the fallen stone fireplaces only remaining at excavations which mark the spot upon lots 2 and 3, section 29, township 146, range 31, the ruins of an old mission are situated on the north shore opposite the island of Ozawindib, named after Schoolcraft's guide, and the Ojibway population know no date connected with the coming of their forefathers, when the Sioux retired from this most central location of the upper basin, unable to withstand the onslaughts of their advancing enemies. The islands in Cass lake also plainly reveal a former occupancy by a prehistoric race, for there also can be found in abundance the same imperishable relics of pottery and chipped stone which exist at the other points along our route.

Owing to stormy weather we concluded to change our plans somewhat, and turned toward the portage from Pike bay to Leech lake. At the southern extremity of Pike bay, where we were encamped for a day, an extensive prehistoric village existed along the plateau there situated, and the stone spalls and pottery shards collected along the old trail from this point to the north shore of Leech lake yielded an abundant and interesting budget of information concerning the discovery and use of these old portages long centuries before Lieutenant Pike or the Ojibway Indians traversed the locality situated between the two points named.

Our investigations at Leech lake revealed the former existence of a great central village of Mound-Builders, situated for miles along the north shore, upon that broad point of land immediately east of the most northwesterly arm of the lake. It may be safe to determine that the most central portion of this ancient town was situated upon sections 23 and 26, town-

ship 143, range 31. My accommodating Indian guide led the way to an innumerable line of burial mounds of different forms and sizes, some in groups, others scattered about, and some variously modified by intrusive burials. At one point I noticed modifications which suggested the possibility that they had been used as rice-pits by the native population. A handsome collection of relics at this locality rewarded our search. At one point the former existence of an old trading station was noticed, the old stone fireplaces marking the spot. Finding no name for this broad and extensive point of land heretofore applied, I have called it Mound point. The Ottertail point of Dr. Coues' chart of 1895 should be east of Goose island, where we also found ample evidences of the existence of a former mound-building population.

An unfortunate misunderstanding having occurred between my companion and some native Indians, who object to surveying operations upon their reservation, we removed from this interesting locality to the southwest arm of the lake and thence to the mouth of the Shingobi river, where we were storm-bound, and this change of base was made without a coveted exploration of the Ka-be-ko-na lake and river, at the west side of Leech lake, where a prehistoric occupancy existed, probably quite as extensive as that of Mound point. This information we gained from our Indian neighbors.

The ascent of Shingobi river was to me an important event, for reaching the portage to the Crow Wing lakes and river, which crosses the Itasca moraine, I followed the deep trail to the east shore of a small lake, across which, the next day, we discovered a well-defined prehistoric village site and mounds, away from which led, toward the westward, the same trail to the Crow Wing river. This old village site and mounds are located about half way between the Shingobi and Crow Wing rivers, but upon what particular section we did not determine. It will be remembered that Mr. Schoolcraft and Lieutenant Allen passed over this identical portage in 1832, and it was also the portage traversed by Morrison previous to that time, when he wintered at the eastern end of Fishhook lake, missing a meeting with Lieutenant Pike, which would have proved an historical event.

Continuing our voyage, evidences of an ancient occupancy were discovered in the valley of the Crow Wing, notably at the Eleventh lake and at the eastern extremity of Colonel Martin's Elbow lake. During the continuance of our voyage we gathered from the natives and others all possible information concerning the well-known imperishable signs of the Mound-Builders, which, coupled with our own observations, proves beyond question that prehistoric man migrated to and occupied the entire upper water-shed of the Mississippi, from



OJIBWAY KNIFE, SPEAR, PUNK, FLINT AND STEEL.

Itasca lake to the mouth of Leech Lake river, and downward from there to the Sandy lake locality, that all the portages from lake to lake and from river to river, so extensively used even to the present time, were not discovered and opened by the Sioux or Ojibway Indians, but are prehistoric in character, and the tribes named came after the Mound-Builders in the use of that entire system of portage communication. That this mound-building population, whomsoever they may have been, first traversed the Cut Foot Sioux portage, the portage from Beltrami's Julian source to Red lake, the portage from Pike bay to Leech lake, and the Shingobi portage, occupying for an unknown period of time the whole extent of territory drained by the upper branches of the Mississippi, residing



AT THE PORTAGE.

Shingobi River to Crow Wing Lakes.

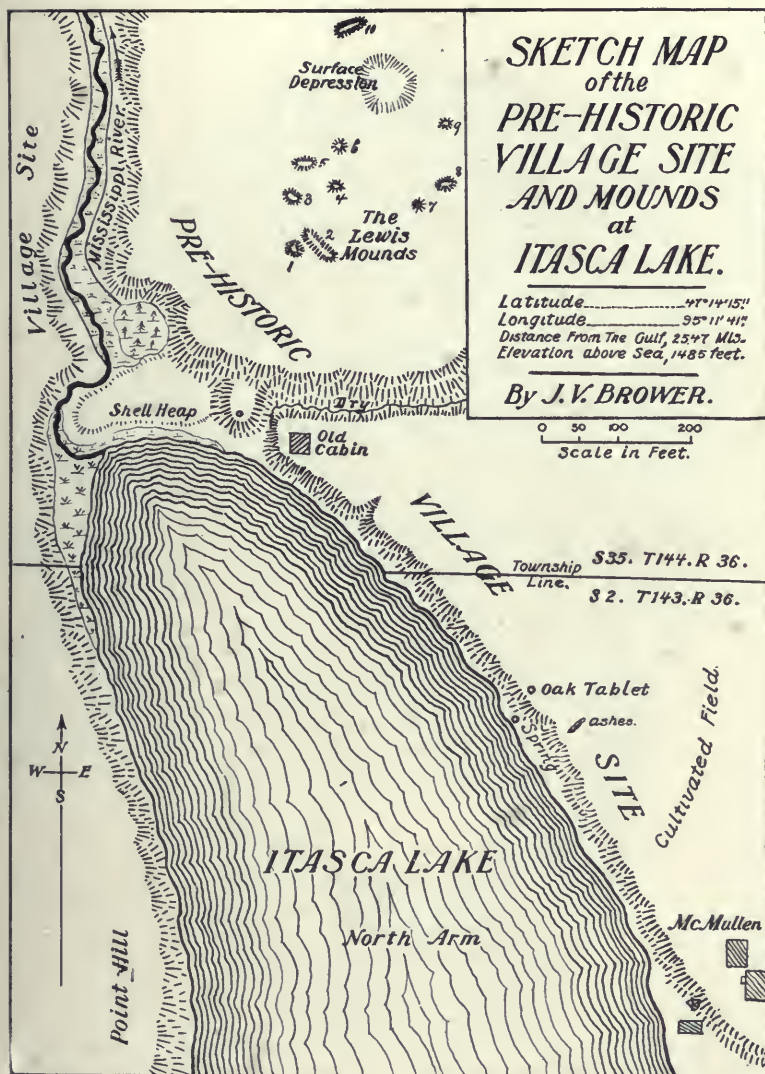
usually upon the shores of lakes near the outlet or inlet, or both, in villages, subsisting principally upon game and fish, and using extensively pottery vessels made of pounded stone and clay, sand and clay, or pulverized mussel-shell and clay, stone implements, the bow and arrow, stone spears, copper implements, and either skin, bark or log canoes, there is no doubt whatever. The size of these people was undoubtedly from five feet six or eight inches, to six feet one or two inches, in height, as evidenced by the exhumed remains examined. The regular and symmetrical formation of the skulls examined indicates a high order of tact and sagacity on the part of this lost race, and it seems reasonable to presume, and I believe, the effigy mounds constituted a place of worship or celebration of some significance, for this mound-building people. That the flesh was removed from the bones previous to burial seems certain, but in what manner is doubtful, and the pur-

pose was apparently to preserve the remaining bones by a process almost a hermetical sealing in character. I noticed no evidences of cannibalism. The war-arrow point, triangular and without notched base, seems to have been commonly used.

Whence came these people, and how and when did they depart? is a question that I do not believe can be correctly answered. Concerning the date of their occupancy of this remote and ultimate reservoir system of the Mississippi basin a final determination may be formulated from one of two propositions: First, that there may have been a large number of people there for a comparatively short period of time, or, second, a limited number for a much longer period. The preference would be for the latter suggestion, for a portion of that which remains after them appears of great age and of a remote antiquity, and scientists, to whose acute judgment I am perfectly willing to yield, will not surprise me in entertaining an opinion that the locality examined was occupied by a mound-building race of men more than twelve hundred years ago. All I claim for the few months' labor I have devoted to this subject, entirely at my own personal expense (with the exception of the amount paid by the late Mr. Hill), can be embodied in a few words. It can now be correctly represented that a mound-building people formerly occupied the entire extent of the basin of the Mississippi from Itasca lake to the Falls of Pokegama; that the principal portages throughout that locality are the portages formerly discovered and opened at an unknown date by the same people, and that they were a race of men superior to the Ojibway population now occupying the locality, as evidenced by facts which have now come to light; and that those facts can be augmented very materially by a detailed survey and examination of the village sites, mounds and portages now known to exist there. There is no reason why statements should be accepted as true, unless there is first the most convincing and indisputable proof offered to substantiate a fact stated, and these facts now stated for the first time are to me as indisputable as they are interesting and instructive. Of the seventy-five or eighty remains exhumed, the Itasca and the Tascodiac skulls are illustrated, and they show a remarkable perfection of the human brain at that early period, as regular in symmetrical outlines and formation as the white population of the present time. To fully appreciate this statement it is necessary to see and examine these skulls.

Other illustrations of interest and coincident herewith are given, and they supply that which is lacking in the meager outlines of these brief pages, and an intelligent study of them will unfold a more graphic story than I am able to depict through the medium of this curtailed narrative, hastily written on the eve of my departure to the basin of the Missouri.





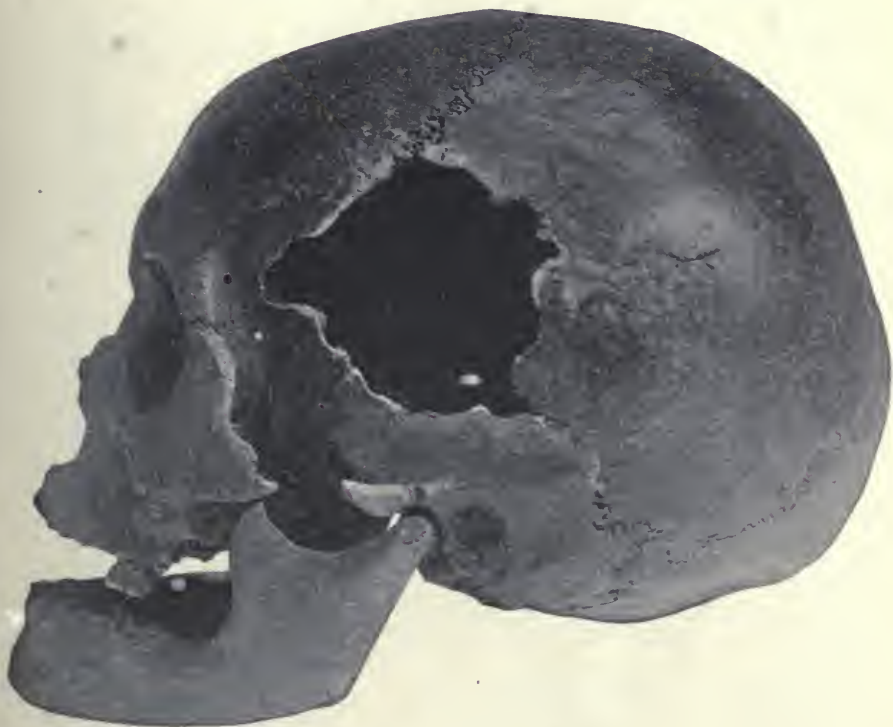
[Note: The above map does not show the extension of Point Hill, at which is located one mound and a large deposit of animal bones at the extremity of the point. The Itasca lake skull, portrayed, was taken from Mound No. 3, and the greater portion of the relics collected were found between McMullen's cabin and the outlet of the lake.]



THE ITASCA LAKE SKULL.

Photo by Swen.

Exhumed from Mound No. 3 of the Lewis Group.



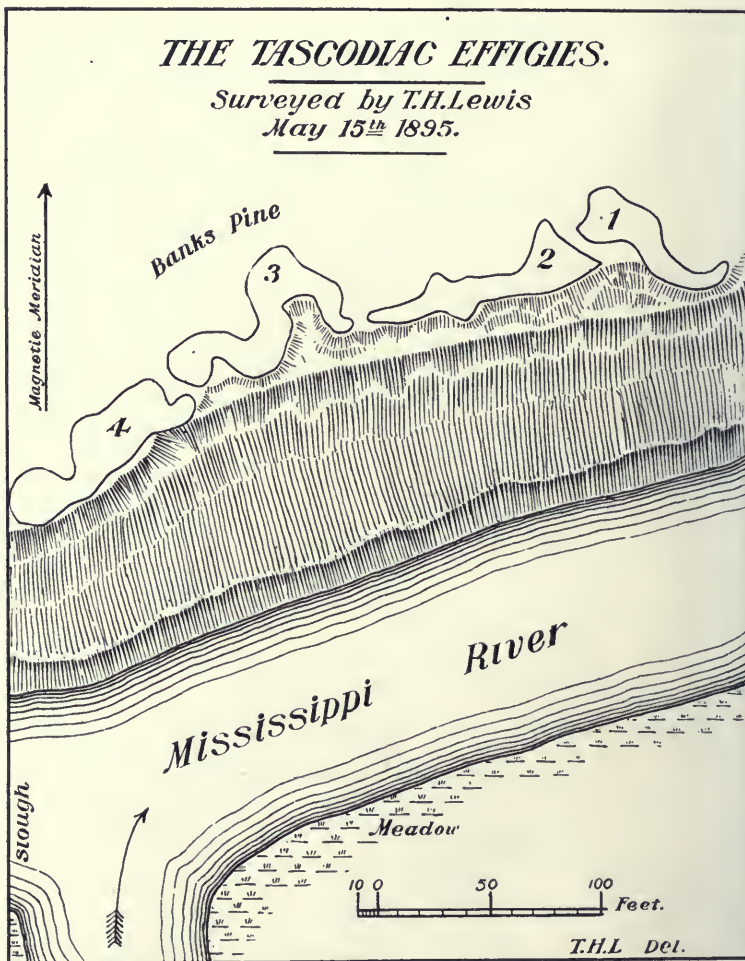
THE TASCODIAC SKULL.

Photo by Swen.

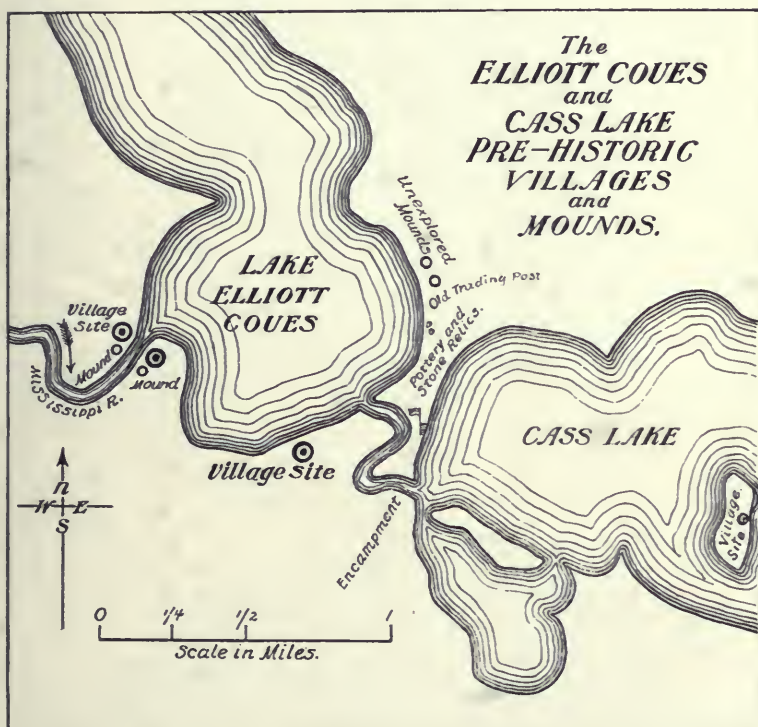
[Note: There are reasons for believing that that portion of this skull found missing at the time of excavation, as shown in the above plate, was, by some means unknown, separated apart at the time or before the interment took place. Nothing was found to show whether the death was by violence or otherwise. The remains of thirty-five interments were found or exhumed, from the one mound excavated, in a space down through the centre of the place of interment less than seven feet square. The examination was not sufficiently complete to determine the exact number of skeletons so long at rest in this isolated locality. There was no evidence found to indicate that they were not the builders of the Tascodiak effigies.]



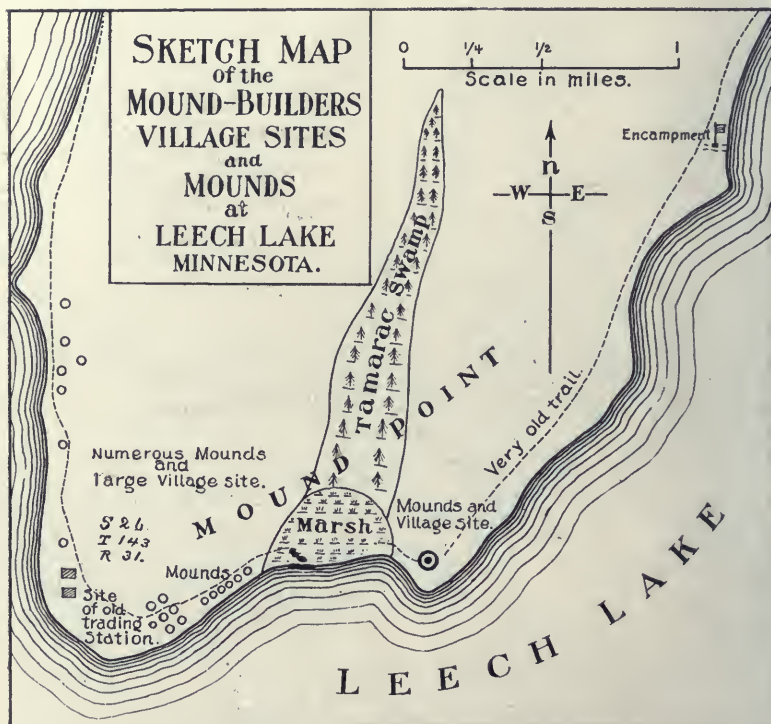




[Note: Immediately in the rear of Mounds 3 and 4 is a very considerable depression, several feet in depth, from which, it is possible, the earth was excavated for the construction of these interesting Tascodiac effigies.]



[Note: Indications point with an unerring certainty to a probability, that the mound-building population occupied many localities at and in the neighborhood of Cass lake and the rivers and portages leading to and from it, which would require a considerable length of time to explore and survey. An important village site was discovered at the southern extremity of Pike bay, seven miles south of the islands shown in the above sketch map. Leading south from the Pike bay village site is a prehistoric trail or portage, along which was collected several relics. This trail or portage leads to the north shore of Leech lake, at one of the great central village sites of the ancient occupancy at Mound point.]



[Note: There is probably about one hundred miles of shore line at Leech lake, of which extension less than five miles was explored, creating the reasonable supposition, that, adopting Mound Point as a criterion, there are nearly or quite two hundred mounds at and near this lake and the rivers flowing into it, which would require more than a month's time to properly explore and survey. The principal streams flowing into Leech lake are Little Boy, Shingobl, Ka-be-ko-na, and Bukesagidowag (or Steamboat) rivers, and numerous smaller lakes and streams are found in all directions. After the retirement of the Sioux Indians this locality was selected by the Ojibways, as one of several permanent places of abode, where they still reside, subsisting principally upon game and fish and the annuities paid by the United States under treaty stipulations, or according to congressional enactments.]



SIDE VIEW OF A TASCODIAC EFFIGY MOUND.



END VIEW OF A TASCODIAC EFFIGY MOUND.



FIFTEEN DISTINCT SPECIMENS OF POTTERY SHARDS FROM THE
TASCODIAC AND OTHER LOCALITIES.

Photo by Swem, St. Paul.

[Reduced one-third from natural size.]



EIGHTEEN DISTINCT SPECIMENS OF POTTERY SHARDS FROM ITASCA
LAKE.

Photo by Swem, St. Paul.

[Reduced one-third from natural size.]



SPECIMENS OF RELICS COLLECTED AT ITASCA, BEMIDJI, TASCODIAC,
COUES, CASS AND LEECH LAKES.

Photo by Swem.

[Reduced one-fourth from natural size.]



STONE PIPE FROM CHEMAUN CREEK AND DISK AND HAND HAMMER
FROM ITASCA LAKE.

Photo by Swem.

[Reduced one-third from natural size.]



OJIBWAY FAMILY CANOEING.

BEADS AND PIPE.

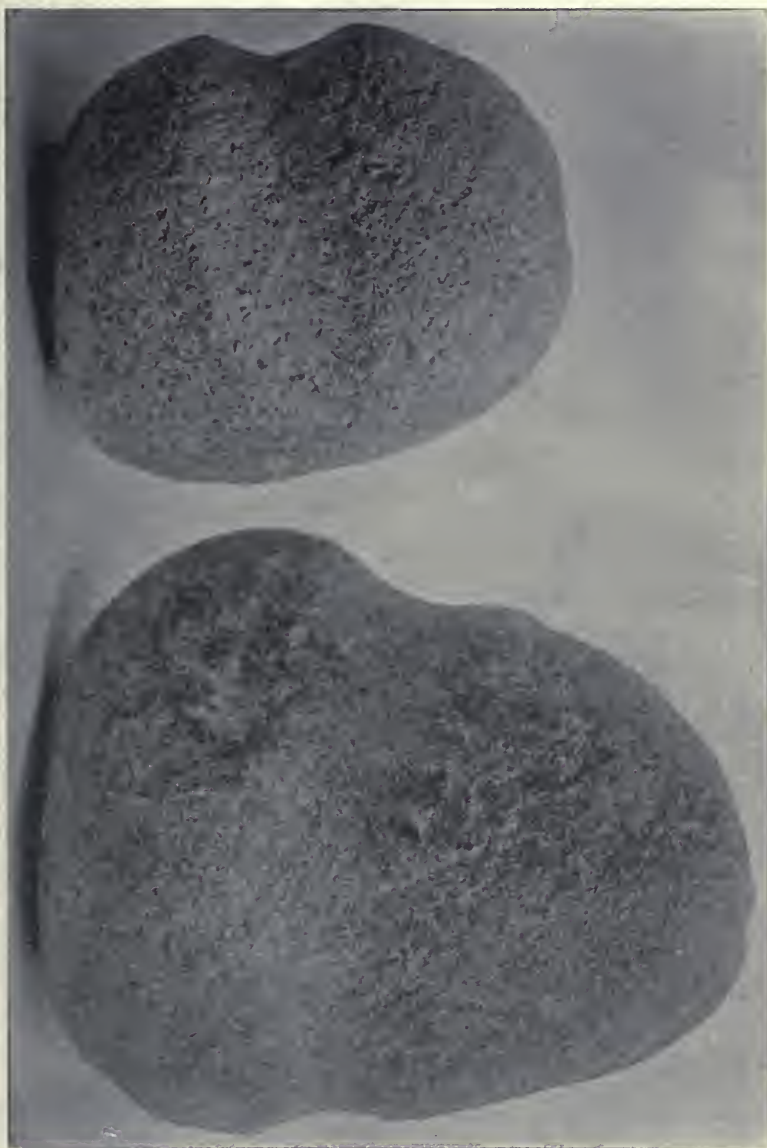
SOME OJIBWAY VISITORS.

THE BELLES OF CASS LAKE.

EXPLORING MOUNDS.

INDIAN SCENES IN THE OJIBWAY COUNTRY.

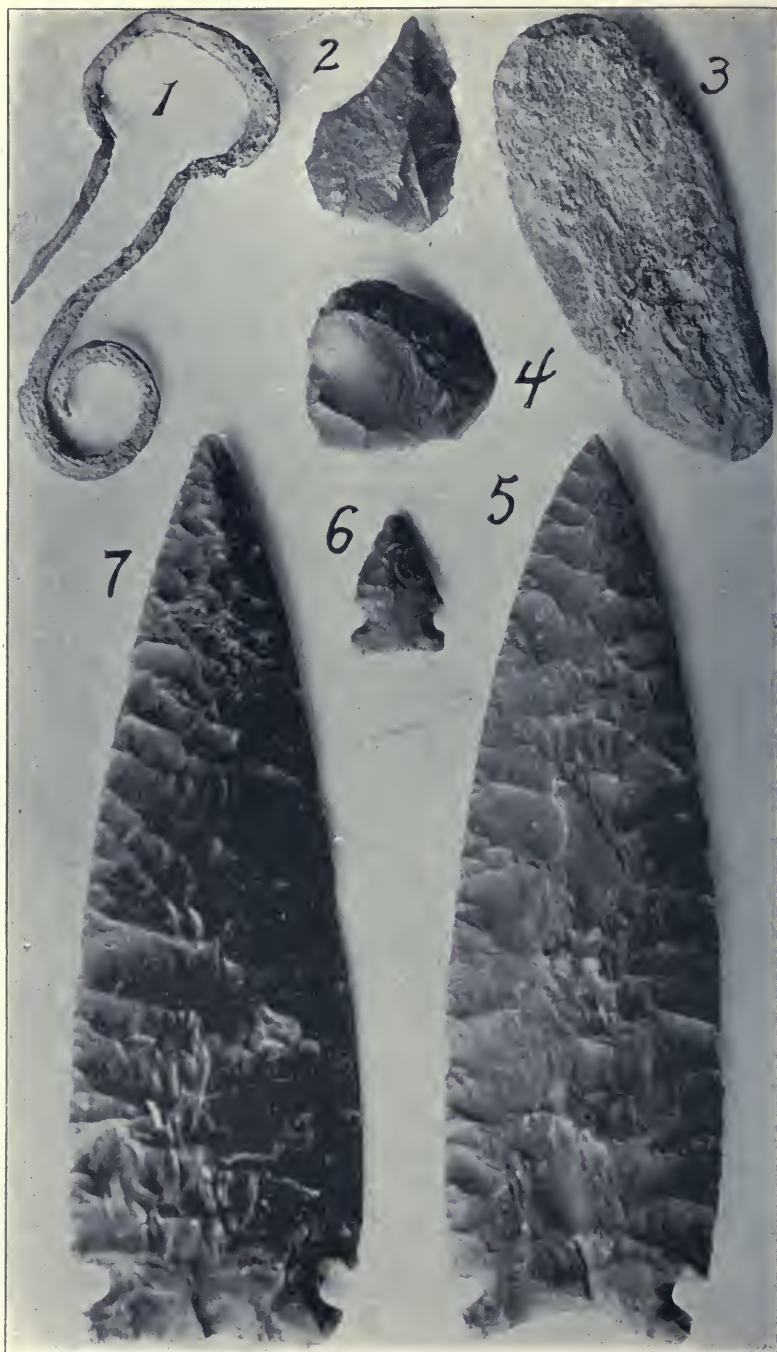
[Note: The view described "Exploring Mounds," is reduced from a photograph showing a well-dressed Ojibway Indian standing on top of a burial mound, at Leech Lake, Minnesota.]



STONE HAMMER, FROM LEECH LAKE.

STONE HAMMER, FROM ITASCA LAKE.

[Reduced one-half from natural size.]



RELICS COLLECTED IN AUGUST, 1894.

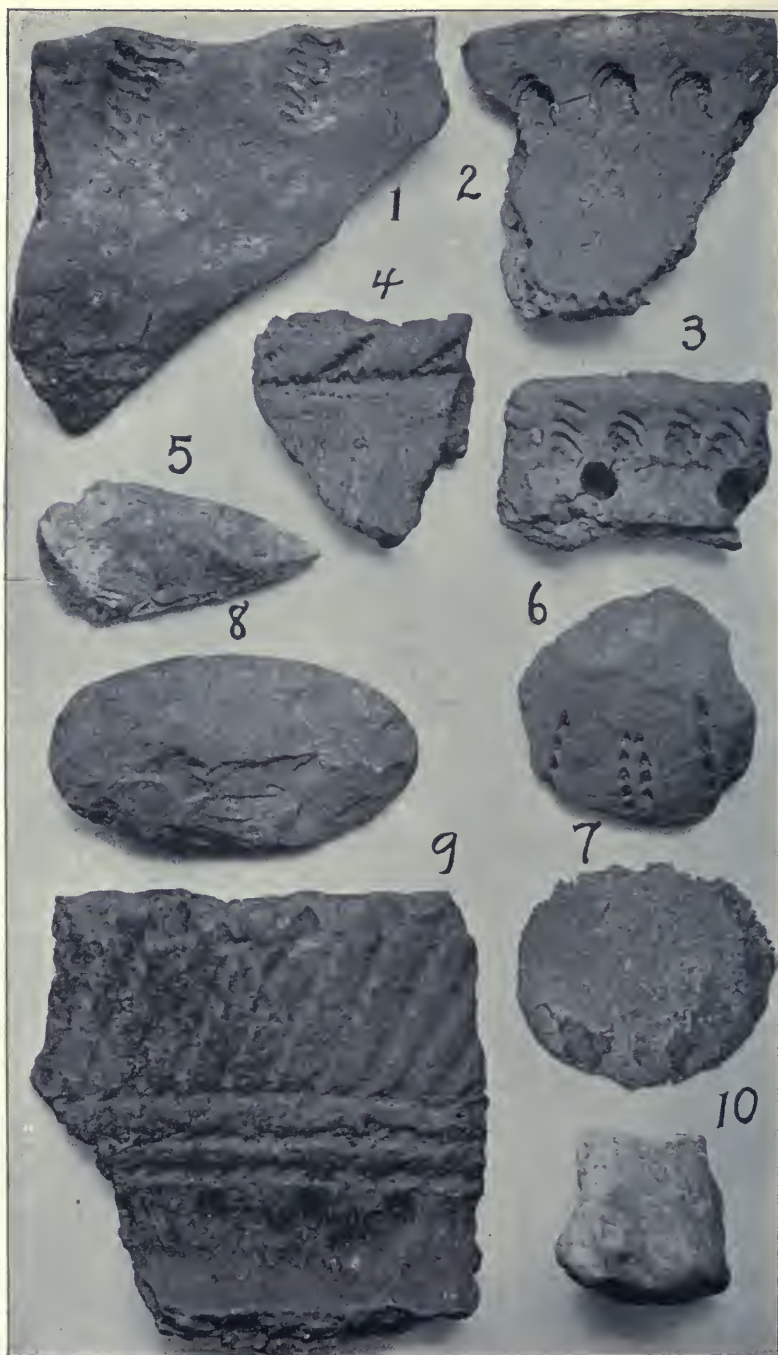
1, copper; 2 and 4, spalls; 3, chipped implement; 6, arrow point; 5 and 7, transparent spearheads of hornstone. Natural size.



THE MISSISSIPPI,
Above mouth of Nalwa River.



SCHOOLCRAFT ISLAND.
Itasca Lake.
(Looking Northwest.)



RELICS COLLECTED IN OCTOBER AND NOVEMBER, 1894, AT ITASCA LAKE, MINNESOTA.

1, 2, 3, 4, 6 and 9, pottery shards; 5 and 8, stone relics; 7, copper; 10, petrified bone.

[Reduced one-fourth from natural size.]



STONE RELICS COLLECTED BY PROF. T. H. LEWIS, 1895,

At Itasca Lake, Minnesota.

[Slightly reduced from natural size.]



COPPER RELICS OF THE MOUND-BUILDERS.

From Sandy Lake, Minnesota. (One-half natural size.)



OJIBWAY CHIEF AND HEAD WARRIOR.

Bois Fort Reservation, Minnesota.

By permission of Rev. J. A. Gillan.



PI-ZI. (Chief Gall.)

The noted Sioux warrior who led the Indian forces at the Custer massacre.

From a copyrighted photograph by D. F. Barry. (All rights reserved.)



SITTING BULL.

The noted Medicine Man of the Sioux.

From a copyrighted photograph by D. F. Barry. (All rights reserved.)



MR. D. F. BARRY and RAIN-IN-THE-FACE. (ETEO-ME-CUSHA.)

Reproduced by permission of Mr. Barry.

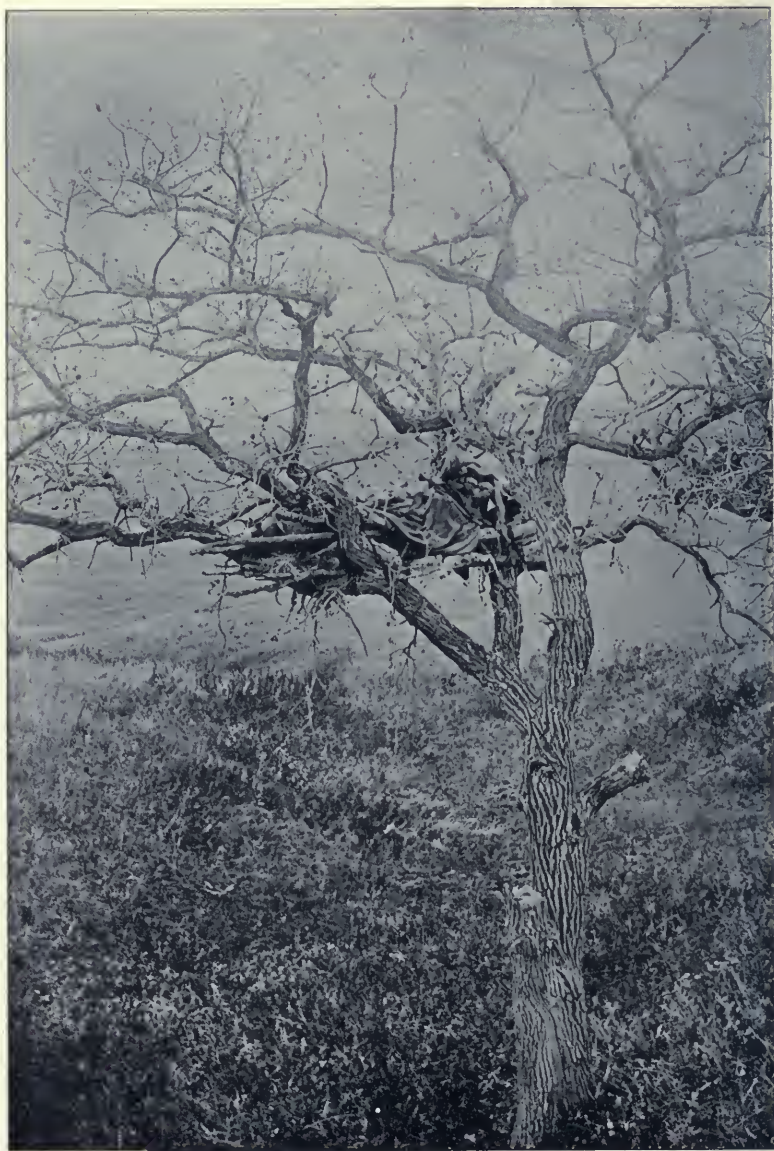
Explanatory Note.—Mr. D. F. Barry (Eto-Wapa-Chasa) of West Superior, Wis., a noted photographer among the wildest Indian tribes of the West, kindly granted permission to reproduce several of his famous copyrighted photographs for this article. His operations were principally on the Upper Missouri river, where among the Sioux he was known as Eto-Wapa-Chasa, or Little Shadow Catcher, and for many years was known by no other name among the warlike Sioux. From interviews and the letters of Mr. Barry much of interest and historic importance is learned concerning some of his photographs and the Indian subjects, which, very much condensed and abbreviated, is noted, explanatory of some of the illustrations:

Chief Gall was one of the most noted Indians of the West, proud spirited, commanding, and warlike, in peace a friend and in war an enemy. His bearing was almost regal, his face expressive, and his slightest motion graceful; a brainy and intrepid chieftain of the most warlike band of Indians known in modern times. It was Gall and Crazy Horse who commanded the Sioux in the sanguinary engagement which resulted in the death of General Custer and his immediate command at the battle of the Little Big Horn. On June 25, 1886, Gall was present with the Reno survivors at the last battlefield made memorable by General Custer. He was moody and silent, and as he walked over the battlefield so familiar to him he seemed oppressed. It had been the intention of the Reno survivors to invite Gall to visit with them again at the battlefield, on June 25, 1896. His eloquent description of Custer's last fight will never be forgotten by those who heard it. He died at Standing Rock in December, 1894.

Sitting Bull, who became so noted on account of the mistake made in designating him as the leader of the Sioux warriors at Custer's last battle, June 25, 1876, was a medicine man among his people, and maintained his popularity with them with all the arts of his calling, even to the extent of distributing silver coins. He was shot by members of his own nation, acting as Indian police, while effecting his arrest.

Rain-in-the-face, a chief, was a brave and daring Indian and a murderer who, with his own hand, killed Dr. Halzinger and Mr. Baliran in 1874, for which crime he was arrested, but escaped before trial. He participated in the Custer fight, and had the reputation of cutting out the heart of Capt. Tom Custer, the general's brother, but the report was untrue.

Rain-in-the-face, whose life has been turbulent and full of trouble, is now living quietly at Standing Rock, in North Dakota, which takes its name from an Indian woman who turned to stone; so held by the Sioux in reference to a peccoliar rock of the locality which stands upright, resting on one end.



TREE BURIAL AT STANDING ROCK, NORTH DAKOTA.

From a photograph by D. F. Barry.



SIUX GHOST DANCERS AT THE STANDING ROCK, NORTH DAKOTA.

From a photograph by D. F. Barry.



HER-LODGE-
IN-SIGHT.

HAS-FOUR-
ROBES.

SEEN-BY-THE-
NATION.

STANDING-HOLLY.

From a photograph by D. F. Barry.

The two wives of Sitting Bull and their respective daughters, on either side. The two wives are sisters, and daughters of the Chief Grey Eagle. The polygamous daughters of Sitting Bull, when well dressed in the usual Indian costumes, were considered to be handsome types of Indian women.



AN OJIBWAY SUMMER LODGE.

White Earth, Minn.

By permission of Rev. J. A. Gillilan.

Note.—This summer lodge was constructed by setting poles in the ground in a circle, bending down the top ends and fastening them in hoops over the center with strips of basswood bark. Over this rude frame of hoop-poles, large strips of the bark of the White Birch are spread and tied on or held down with wooden weights. An opening is left at one end which constitutes the door. The ground is the floor, and handily made mats of rushes and water grass are spread on the sides and rear end. The meal is cooked over a fire on the outside of the lodge and eaten on the mats, in sitting posture, from tin or wooden plates. At night the family retire, using the mats as couches and blankets for covering. There are seldom two apartments in one lodge.

The winter lodge is of long poles set upright and leaning to a common center at the top. These poles are set in a circle and are covered with mats, bark, or rawhide. A fire is maintained in the center, and the smoke escapes through the opening at the top of the poles. Soil and debris are usually thrown up around the outside, and the family live sitting upon mats spread about the fire. See page 14.



Camp Trouble.
Mississippi River.
Stony Ridge.

Norway Pine.
Bemidji.
Ojibway Graves.
Point Hill, Itasca Lake.

SCENES IN THE OJIBWAY COUNTRY.

REV. EN-ME-GA-BOW. (STANDING-IN-FRONT.)

A BRIEF DESCRIPTION OF THE LIFE-WORK OF A REMARKABLE
OJIBWAY INDIAN.

Rev. John Johnson (En-Me-Ga-Bow) is an Episcopal clergyman, resident at White Earth, Minn. His true name is "Standing-in-Front." Born of heathen parentage, about A. D. 1815, on the northern shore of Lake Ontario, a full-blooded Ojibway Indian, he was in his youth seriously ill, and to effect his recovery his heathen grandfather conferred upon him, with all due ceremony, a new name, that it might, according to a prevalent idea, carry him safely through the threatening illness. Thenceforth, and to this time, he has been known as En-Me-Ga-Bow. When a very small boy he was invited by a Church of England clergyman to enter his family and be educated, at Peterborough, Canada; rebelled against the unusual change, ran away, and resumed his Indian life. Age, however, brought a desire for improvement, and he commenced his studies in the lodge by the light of pine knots. Drifting along the Great Lakes he reached Fond du Lac, Minn., near Duluth, and was employed by Bishop Cavanaugh, a Methodist divine, as an interpreter among the Ojibway Indians in church work. About 1839 he was sent to the Methodist College at Jacksonville, Ill. There he attended a murder trial and heard a tall, raw-boned man, with shrunken cheeks, pleading very earnestly for the life of the accused. His companion said to him, "That is for money." "No," said En-Me-Ga-Bow; "he is in earnest, and believes every word he says." It was Abraham Lincoln, then an unknown village lawyer. Returning to Minnesota, Mr. Johnson pursued various walks in life as a hunter, lumberman, and catechist, and married. About 1845, at Fort Snelling, Minn., he witnessed the service of the Episcopal Church, performed by the chaplain, Dr. Gear, the pioneer Episcopal clergyman of Minnesota. Commending the service, he advised Dr. Gear that he thought it far better adapted to his Indian people than the Methodist or any other denominational instruction. Thereafter, through the influence of Mr. Johnson, several Ojibway chiefs applied to Dr. Gear for the services of an Episcopal clergyman, to be exercised in the north among the Ojibway Indians, and the famous Rev. Dr. Breck consented to go. Dr. Breck went from St. Paul to Gull Lake in 1852, where he had Mr. Johnson for his interpreter. At the end of a few years Dr. Breck was driven out of the country, but Mr. Johnson remained, and Oct. 13, 1859, was ordained by Bishop Jackson Kemper as a missionary resident among his own people at Gull Lake. No progress was made, however, owing to the expulsion of Dr. Breck and the troubles that followed, and especially the Sioux massacre of 1862, into which the Ojibways were nearly drawn by their principal chief, Hole-in-the-day. However, Bad-Boy (Que-we-sans-ish) Big Dog (Neba-quam), and others thwarted Hole-in-the-day in his designs, which cost him his life, and in 1868 the Gull Lake band of Ojibways were removed to the White Earth reservation.



REV. EN-ME-GA-BOW.

En-Me-Ga-Bow went with his people to White Earth, where he has ever since remained. A little log church was built, and, in the language of the noted missionary, Dr. J. A. Gilfillan, who unselfishly furnishes the information for this brief description, "at last the harvest came."

In a few years nearly all the chiefs and their people became Christians, were baptised, cut off their scalp locks, assumed the garb of the white race, and settled down to the life of farmers. A beautiful stone church, costing \$10,000, was erected, and En-Me-Ga-Bow is the permanent rector, with communicants numbering 112, from 64 different families; in all 338 souls. The rector is the first Indian priest of the Episcopal church ever ordained in the United States, according to the statement of Dr. Gilfillan, and is an eloquent and persuasive orator and divine, both in his mother tongue and in English, which he speaks fluently and just enough broken to make his discourses all the more interesting. Eloquent appeals and addresses at Baltimore, Philadelphia, New York, and Boston by En-Me-Ga-Bow, caused the building of his stone church at White Earth by voluntary subscriptions, a result that no other divine could have accomplished, and St. Columba, the stone edifice, stands as a monument to christianizing labors of a full-blood Indian among his race.

He has been at the city of Washington on nine separate occasions, with delegations of his people, and when last he was there, at a reception at the White House, a larger and more distinguished gathering assembled about En-Me-Ga-Bow and his wife than any other guest, or even the president himself.

Physically, mentally, and morally this native missionary has been a magnificent man, and he survives his twelve children, nearly all of whom died in adult years of consumption. His faithful wife, Iron-Sky-Woman, died in 1895, leaving him alone in his aged years, with his church and his converts.

Many years ago, date apparently unknown, he descended the Mississippi river past Fort Snelling to Prairie du Chien, from Northern Minnesota, meeting with no white man on the way, except the soldiers at the fort.

This remarkable Indian has witnessed the Western empire rise in its might in the basin of the Mississippi.



NEBA-QUAM (Big Dog.)

Chief Warrior of the Pillager Band of Ojibway Indians.

1. See official map of Minnesota, 16 St. Mary's Parsonage, Manchester.

NOTES ON AN ANTARCTIC EXPEDITION.

By Mr. CLEMENTS R. MARKHAM, C.B., President of the Royal Geographical Society.

[Read to the Members in the Library, Wednesday, January 30th, 1895.]

It is now more than half a century since the last Antarctic Expedition sailed from England under the command of Sir James Ross, and it has always been recognized that the results of the famous enterprise were most important from every point of view. In the succeeding fifty years the needs of science have increased, new fields of research have been opened, the means of prosecuting discovery have been enlarged, and it is now the conviction of scientific men throughout Europe that Antarctic research must be resumed.

The scientific results will be numerous and important. There has been a secular change in the magnetism of the earth since the time of Sir James Ross, which is known for a large portion of the world, but no information is available for the regions south of 40° S. lat. The exact position of the south magnetic pole is hardly even approximately ascertained. Not only are magnetic observations necessary for the accurate study of terrestrial magnetism—they are also of practical value for the safe navigation of the Indian Ocean. This is alone a sufficient reason for the dispatch of an Antarctic Expedition. But there are many other reasons of almost equal cogency. Deep sea soundings and temperatures at all depths are needed for the study of the Antarctic Ocean; dredgings, the character and distribution of marine organisms, meteorology, pendulum observations, the discovery of the extent of the south polar continent, the nature of its glaciation, and the character of the rocks and their fossils, all need investigation. With the aid of modern appliances, such results will be obtained as will enrich science, materially increase the stock of human knowledge, and do credit to the country.

Immense as the benefits to be derived from an Antarctic Expedition will be to science, they are equalled by its usefulness to our navy. Less sea work is to be obtained by officers and men than was formerly the case owing to the great expense of keeping large battle ships at sea. But thorough seamen should have varied experiences afloat, which can only now be sufficiently supplied by training squadrons, and above all by expeditions of discovery. Officers and men, in battling with and overcoming the ice packs and storms of the far south, will be acquiring experiences and training which will make them more efficient and more serviceable to their country. Hyde Parker and many others of our best naval officers in the last century began their sea service in voyages of discovery. Nelson's training surely deserves imitation. It was commenced in the Arctic Regions; as was that of Sherard Osborn, Keesey Hamilton, and others among our best modern naval officers.

If Antarctic research is indispensable to science, and most beneficial to our navy, it is equally desirable as part of our Colonial policy; for it is work in which our Australasian Colonies may fitly co-operate with the mother country. To their ports the eyes of the civilized world will be turned, when the ships return each winter, laden with the rich scientific fruits of their work. More especially in their interests will the magnetic observations be utilized, by rendering the navigation of the

Southern Ocean safer. Above all there is nothing that will bind closer the affectionate ties between the mother country and her Colonies, than this co-operation in the perilous but glorious work of exploration.

The dangers of Antarctic navigation will be very much reduced by the substitution of screw steamers for sailing vessels. Even in the round-bowed, unhandy old *Erebus* and *Terror*, Sir James Ross and his gallant companions encountered, battled with, and overcame the formidable ice pack of the Antarctic Ocean. In calms and adverse winds a steamer would make 100 miles while a sailing vessel would be beating up 20. With steam it would be possible to do in one season all that Ross, Wilkes, and Dumont d'Urville combined, did in three seasons. A steamer would be in little danger from bergs, except in fogs, and in heavy gales she could lie in safety under their lee. She would also be better able than a sailing vessel to double the ice pack. So that if the old *Erebus* and *Terror* did good work, as they undoubtedly did, screw steamers will do ten times as much. These considerations, which comprised the immense scientific importance of an Antarctic Expedition, its beneficial effects on the navy by fostering a spirit of enterprise, its influence for good in our Colonies, and the vastly increased facilities for securing success, made it the duty of the Royal Geographical Society to undertake the work of organizing a combined effort to secure the dispatch of a naval Antarctic Expedition. Considerable progress has been made. Reports have been prepared by scientific and naval experts. The cordial adhesion of the Royal Society and of the British Association has been secured. Appeals have been made to the other scientific bodies, and to the Australasian Colonies, and preparations have been made to bring the subject to the notice of Her Majesty's Government backed by the united scientific and patriotic feeling of the empire.

If public opinion is distinctly and clearly pronounced there is no doubt that the Government will accept the mandate and fit out the expedition under the best auspices. It is, therefore, of the utmost importance that enlightened public opinion should be brought to bear. This can best be done by scientific bodies, and no Society can do this excellent work better than the Manchester Geographical Society.

Bishop Hanlon at Leh.—About the end of 1889 Bishop Hanlon was sent out to his first missionary field of labour, which was that of Ladak, where he succeeded Father Kilty, a Liverpool man, who had died there a year or two before. With one companion, Father Hanlon set up his abode at the capital, Leh, and founded the mission station known as St. Peter's. The mission was one of peculiar difficulty, the only other European settlement being the Moravian Mission, which is of old standing. Hanlon threw himself with characteristic energy and thoroughness into his new life. His first object was to acquire a thorough knowledge of his people, their language, manners, customs, and beliefs. In a surprisingly short time he had become a master of the Bot or Thibetan language, so that he was soon able to discuss fluently the most abstruse philosophical questions with the Buddhist lamas, or monks, as is seen from the 'Buddhist Dialogues' he afterwards published. He also studied with great diligence the Buddhist religion as it exists in that part of Thibet, and became so friendly with the lamas that he enjoyed several times the probably unique privilege of being allowed to give public lectures on the truths of Christianity in the interior of the goupas or monasteries themselves. All these goupas he visited in the different parts of Ladak, and knew personally most of the lamas. His literary diligence was surprising.—*Manchester Guardian*, August 1st, 1894.

TWO NOTES ON LADAK.

By the Right Rev. BISHOP HANLON, Uganda (formerly of Ladak),* Corresponding Member of the Manchester Geographical Society.

I.

THERE are two points which I wish to introduce briefly to the notice of the Manchester Geographical Society. The first is the influence of Englishmen in Ladak. In the early days (about 1806) of the subjugation of Ladak by Jamma soldiers, the *Wazir* in the employ of the Maharajah of Kashmir, who was an Englishman, Commissioner Johnson, had abolished *slavery* in Ladak, allowing all free men to return to their respective countries, or to remain in Ladak as paid servants if they preferred. The humane rule of Captain H. Ramsey, British Joint Commissioner 1884-90, has given a prestige to Englishmen as distinguished from *other Europeans*; so that in my time an Englishman was looked up to as a man of fairness, uprightness, tolerance and good will to the poor natives. One can easily understand what a step gained this is in a land so far off. It was my endeavour when there to strengthen this impression into a firm conviction wherever I went.

II.

My second point concerns the so-called "Mountain sickness," or "Pass sickness" in the Himalayas; what it is in my experience, and how to avoid it.

I made six journeys over the highest passes, viz: The Sabu pass (18,200ft.), two journeys, and the Kardong pass (16,500ft.), four journeys. The first time I mounted the Sabu pass, in June 1892, I nearly died of mountain sickness. I was all right up to 16,000ft.; after that I became weak, utterly fatigued, and inclined to vomit, very drowsy, and lay in the snow unable and unwilling to move up or down. It was with the greatest difficulty I was urged, pulled and pushed to the summit, where I regained strength from a little wine, and then made the descent, though very faint all the while. The reason was, as I afterwards found out, that I had travelled from 7 a.m. up the steep gorge without refreshment. In July 1893 I made the same ascent, but had taken the precaution the night before to camp at the foot of the pass, about 15,500ft.; rose early next morning, and was making the mountain at 6 a.m., on a light but warm breakfast. Result, no sickness. In June 1892, I was also faint, but not really sick, in the Kardong pass. The reason was the same—I had travelled too far without rest or refreshment. In November 1892, I had rested at the foot of Kardong the night before making it, and had taken a hearty substantial meal before starting; result, I was *very* sick. I should not have taken a *heavy* meal.

In July, 1893, I crossed again the Kardong; had rested at the foot the night previous and taken a cup of hot tea only before ascending. Result, I made the climb without the slightest difficulty, and actually had my breakfast on the summit of the pass, 16,500ft., where we melted snow to make the coffee and made our fire of Yak dung. I thoroughly enjoyed my cold chicken and coffee on the heights that morning.

My concluding advice from all these experiences is as follows:—

1. Not to fatigue the body by too much travelling before making the pass.
2. Not to take a *heavy* meal immediately before the ascent.
3. Make the climb in the early morning if possible.

* The Bishop on his way to Uganda has very kindly written out the above short notes on Ladak, which are of great value.

NEW BOOKS.

OUTLINES OF AUSTRALIAN PHYSIOGRAPHY. By CHARLES H. BURTON, B.A. (Oxon.) Maryborough (Queensland): Alston & Co., Printers. 1894. 180pp.

THESE are comprehensive notes in a very readable form by lectures given by Mr. Barton at Queensland, Australia. There are six chapters, the introductory treating of the general physical features of the continent, its general configuration and hydrography, climate, hypsometry and geology, fauna and flora, and the aborigines, with a chapter of general conclusions. The book is welcome, and of some value, but it lacks an index, which in these busy days is an unpardonable fault. The chapter on the aborigines is perhaps the most interesting, and may be compared with the accounts by Dr. Wallace in Stanford's "Compendium" with advantage. It will be found a useful little book, and gives us an idea of how the geographical question is being treated on the other side of the globe. We do not know the price, but it cannot be high.

STANFORD'S COMPENDIUM OF GEOGRAPHY AND TRAVEL (new issue). Africa : Vol. I., North Africa. By A. H. KEANE, F.R.G.S.; author of Asia in the same series; Eastern Geography, &c. London: Edward Stanford. 1895. With 9 maps and 77 illustrations. 640pp. Price 15s.

THIS new edition in two volumes, of which the first is to hand, has been practically re-written, and except a few paragraphs the work of the late Mr. Johnston disappears. Mr. Keane says: "It will be seen that a somewhat wider scope is here given to the subject of geography than has hitherto been used." To this statement we can have no objection if the "wider scope" is kept rigidly under control. But when we find the closing words of this first volume, on the state of Egypt, to be—"All this material progress is absolutely dependent on one factor, the stability of the political status, which, humanly speaking, can only be maintained by a permanent BRITISH occupation of the Nile Valley," we feel we are no longer having a book on geography, but on a political matter, which it would be best for a geographer to let alone.

The book itself is admirable, an introduction giving an account of the physical features of the continent, the ethical relations, geographical research, the discoveries, Arab slave traders; the partition of Africa and a table of the extent and population of the possessions and "spheres of influence" of the European powers in Africa occupies twenty pages, and is very full of information.

The Atlas region, Tripolitana, the Sahara, the Black Zone, West, Central, and East Soudan, Italian North-east Africa, Egypt, and Nubia, and an index complete the scheme of the book. Illustrations old and new are added, and the revised maps are very useful for ready reference.

This edition is a great improvement on the former ones. The facts in relation to each district are dealt with in the same way, and comparison is easy. The chapters on the Gold Coast are very interesting reading, whilst the fairly full statistical details make the book one necessary to have at hand for reference.

The great reputation of Mr. Keane is upheld by the way he has dealt with a difficult subject, and the manner in which he has been able to steer between over-weighting with too much detail or being obscure. It is a very valuable performance and is also a most interesting volume. The chapters on the Soudan and the inhabitants give information which is just now much required. It is a live book, and is one of the best of this admirable series of Mr. Stanford's Compendiums.

STANFORD'S COMPENDIUM OF GEOGRAPHY AND TRAVEL (new issue). Australia: Vol. I, Australia and New Zew Zealand. By ALFRED R. WALLACE, LL.D., Dublin; D.C.L. Oxon. Author of "The Malay Archipelago," "Geographical Distribution of Animals," &c. *London Edition*: Stanford, 1893. With 14 Maps and 69 Illustrations. 506pp. Price 15s. Australasia: Vol. II., Malaysia and the Pacific Archipelagoes. Edited and greatly extended from Dr. A. R. Wallace's "Australasia." By F. H. H. GUILLEMARD, M.A., M.D., Cantab, late Lecturer in Geography at the University of Cambridge, author of the "Cruise of Marchesa," "Life of Napoleon," &c. Edward Stanford. London, 1894. With 16 Maps and 47 Illustrations. 574pp. Price 15s.

THESE two volumes represent in the new form the former one volume in this series of handbooks published by Mr. Stanford.

The volumes of this new edition are a little smaller in size than the previous edition. They are printed in good sized type, are illustrated with about 120 illustrations, and 30 general and sectional maps. The maps have been brought up to date and are useful. The first volume is due to Dr. Wallace, and the second to Dr. Guillemard.

In this new form these two volumes will be of great value to those who take an interest in these countries, and both the writers are well known as most competent men in reference to the knowledge of these lands.

After an introductory chapter, the first volume gives an account of the Physical Geography, Natural History, Geology, Ethnology of Australia, with some interesting remarks on the origin of the inhabitants.

Then follows a chapter of very great interest, and of somewhat harrowing details, relating the history of colonisation and exploration of Australia. This chapter is one which should not be passed over. The terrible privations, ending in some cases with death, but in others after most heroic efforts in success, form a chapter of human history which is good to read.

Then follows the story of the material progress of Australia, with chapters giving the needful detail to fill up the picture of each colony.

The second volume begins with an introduction on the physical characteristics of the Islands, a chapter on their general features, with some remarks on the Malay race, and then follow chapters on the several groups of islands, dealing with each cluster in a similar way, thus enabling the work of the comparative geographer to be easily done, and making the books valuable as text-books to teachers and others.

There are, we are sorry to find, in the chapters on discovery, omissions of some names which ought to have been mentioned, such as Dr. Macfarlane, whose exploration of the Fly River is referred to in the *Journal*, vol. II., p. 311. Some of these have been pointed out in our *Journal*, in reference to the discovery and exploration of the Fly river. It is quite time Geographers generously recognised the enormous debt they are under in all parts of the world to missionaries, for their discoveries and the work they have accomplished in opening out new lands.

There are several other points in the volumes we should have been pleased to have seen altered, but, as they stand, they are books of great value, and give to us the result of the ripened knowledge and scholarship of two great Geographers.

A series of works like this would, if published abroad, meet an extensive sale, and we trust Mr. Stanford may be similarly rewarded

PROCEEDINGS OF THE SOCIETY.

JANUARY 1st to MARCH 31st, 1895.

The 321st Meeting of the Society was held in the Library on Monday, January 7th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The minutes of meetings held October 24th (313), November 16th (314), December 5th (315), 12th (316), 22nd (317), 26th (318), 23th (319), 29th (320), were read and approved.

The election of the following members was announced :—

ORDINARY : Messrs. William Dewhurst, George R. Falconer, Alderman Robert Gibson, J.P., W. Yates Gibson, E. H. Hallman, J. Hodson, jun., G. Jacoby, C. W. Macara, F. J. Robertshaw, F. Smith, Alderman G. T. Stanley, J.P., J. Henry Walker, Dr. Williamson, A. W. Wilson, Councillor S. Barton Worthington.

ASSOCIATE : Messrs. W. Bottomley, J.P. and J. F. Sullivan.

HONORARY : Sir George Grey, Bart. (New Zealand), General Sir Henry Norman (Governor of Queensland), Sir W. Macgregor, M.D. (Administrator of British New Guinea).

CORRESPONDING : Mr. J. B. Lathom (Paris).

A considerable amount of correspondence was read.

Mr. Alderman J. Bowes addressed the members on "The Story of the Suez Canal."

The address was illustrated with lantern views and diagrams, which had been specially prepared.

Several questions as to the engineering works, mode of construction, and the work of M. de Lesseps, were asked, and a long conversation ensued.

Mr. J. HOWARD REED proposed, and Mr. S. OPPENHEIM seconded, a vote of thanks to Alderman Bowes for his address.

The 322nd Meeting of the Society was held at the Society's House, Wednesday January 16th, 1895, at 7-30 p.m. The Chevalier R. FROELICH in the chair.

The minutes of meeting held January 7th (321st) were read and approved.

The election of the following members was announced :—

ORDINARY : Messrs. G. W. Bardsley and Charles H. Leigh.

The presentations to the Library were noticed at length by the Secretary.

Mr. J. F. TRISTRAM addressed the members on "Notes of a Visit to Oxford," illustrated with lantern slides, diagrams, books, etchings, &c.

The Delegate to the British Association reported on the meeting at Oxford, and gave his impressions of the city.

A long discussion took place, in which Mr. H. T. CROOK criticised the way in which the business of Committee E of the British Association was conducted.

Very hearty thanks to the Delegate and to Mr. Tristram were given on the motion of Mr. CROOK, seconded by Mr. WILDE.

The 323rd Meeting of the Society was held at the Society's House, Monday, January 21st, 1895, at 7-30 p.m. Mr. J. D. WILDE, M.A., in the chair.

Minutes of meeting held January 16th (322nd) were read and approved.

The SECRETARY addressed the Society on "China, Japan, and Corea," illustrating the address with curiosities, maps, and lantern slides.

Mr. R. C. PHILLIPS, Captain UNSWORTH, Mr. A. Y. SCHOLFIELD, and others took part in an animated discussion, and thanks were given to the Secretary for his address.

The 324th Meeting was held in the Society's House, Wednesday, January 30th, 1895, at 7-30 p.m. Mr. MARK STIRRUP, F.G.S., in the chair.

Mr. G. H. WARREN addressed the Society on "Polar Exploration," referring more particularly to the work of the year. Maps and diagrams, prepared by Mr. Warren, and lantern slides, prepared by the "Victorians" for this address, were used in illustration.

A paper by Mr. Clements R. Markham, C.B., was read on "An Antarctic Expedition."

Much discussion ensued on the papers.

Mr. TRISTRAM moved, and Mr. A. Y. SCHOLFIELD seconded a vote of thanks to Mr. Warren, and to the President of the R.G.S., and Mr. WARREN responded.

The 325th Meeting was held at the Memorial Hall, Monday, February 4th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Mr. E. W. MELLOR, J.P., F.R.G.S., &c., addressed the members on "A Ramble in Southern Sweden." The address was illustrated with lantern views from Mr. Mellor's photographs, shown with his powerful lantern, and was listened to by a large audience, and by a number of children from the Deaf and Dumb Institute, who were much interested.

Very hearty thanks were given to Mr. Mellor, to which he responded.

The 326th Meeting was held at the Society's House, Tuesday, February 19th, 1895, at 7-30 p.m. The Chevalier FROEHLICH in the chair.

Mr. H. T. CROOK, C.E., addressed the Society on "The Proposed Dam in the Nile." The address was illustrated with lantern views, and a fine series of maps and diagrams placed at the service of the Society by the Government of H.H. the Khedive, and with some large diagrams prepared by Mr. Crook.

A considerable discussion took place, and very hearty thanks were given to Mr. Crook for his interesting address and for the trouble he had gone to in diagram making. Mr. CROOK replied.

The 327th Meeting was held at the Society's house, Wednesday, February 27th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Minutes of Meetings held January 21st (323), 30th (324), February 4th (325), 19th (326), were read and approved.

The election of the following members was announced :—

ORDINARY: Messrs. John Heywood, Prof. P. Lanzoni, O. K. Onnes, George Pearson, R. H. Reynolds, Fred Walmsley, F.S.A.A., J. H. Watterson, M.C.P., F.R.G.S., and Mrs. A. Y. Scholfield.

ASSOCIATE : Miss A. Ashworth, Miss Carie Moore.

CORRESPONDING : The Right Rev. Bishop Hanlon (Uganda).

Professor W. BOYD-DAWKINS, M.A., F.R.S., addressed the Society on "The Recent Discoveries of Lake Dwellings at Glastonbury," illustrating the address with a series of lantern slides.

A very animated discussion took place in which the Chevalier FROEHLICH, Messrs. WILDE, BELISHA, LAIDLAW, CROOK, and others took part. A vote of thanks was passed to the Professor, who responded and replied to the discussion.

The deaths of the Right Hon. Lord Aberdare, Mr. T. Aldred, Mr. Hilton Greaves, J.P., D.L., and Mr. J. W. Sidebottom, J.P., having been announced, the Secretary was requested to send letters of sympathy to their families.

Mr. J. J. Gleave was cordially thanked for a picture of Swiss scenery presented by him to the members' room.

The 328th Meeting was held at the Society's House on Monday, March 4th, 1895, at 7-30 p.m. Mr. J. D. WILDE, M.A., in the chair.

The minutes of the meeting held February 27th (327), were read and approved.

Mrs. LEO GRINDON addressed the Society on "The Life History of a Mountain," illustrating the address with lantern views, maps, and diagrams.

Mr. JOB IRLAM moved and Mr. MASON seconded a vote of thanks, to which Mr. LEO GRINDON replied for his wife, and gave further illustrations of the subject of the address.

The 329th Meeting of the Society was held in the Lord Mayor's Parlour, Town Hall (by permission of the Right Hon. the Lord Mayor), on Friday, March 8th, 1895, at 3 p.m. Mr. Alderman JOSEPH THOMPSON, in the chair.

The Rev. S. MACFARLANE, LL.D., of New Guinea, addressed the Society on "Early Discovery and Missionary Work in New Guinea."

It had been arranged that Dr. Macfarlane should speak after Sir W. Macgregor had read his paper on New Guinea, but, as Sir William's train was late, it was decided to request the doctor to occupy the time till he arrived, which might be *five*, or *forty*, minutes, and proved to be the latter.

As founder of the New Guinea Mission he gave us an interesting account of some of his experiences during those first years of difficulty and danger in getting at the natives along an unknown coast ; gaining their confidence ; acquiring their language ; discovering large rivers, fine harbours, bays and islands ; establishing mission stations and mission schools, which have led to a growing education and a growing trade. After thirty years' experience amongst cannibal tribes in the South Seas and New Guinea, he is convinced that the popular idea—that native races which are in the age of stone implements and lake dwellings are in a primitive state, and that they are developing upwards from below—is quite a mistake. The languages of these people prove incontestably that they have descended from a higher state of civilisation—that the law of deterioration is, and has been for ages, at work. "We must," said the doctor, "get our knowledge of these people from their languages, legends, and cult ; from these we may learn whence the natives have come, and very often get a fair idea of the road along which they have travelled in their downward course." He referred to one of the Papuan languages, into which he had translated the New

Testament, which has a highly finished grammar, with a court and common language—a grand old ruin of a highly civilised people—and yet the people had lost the art of writing, and gone back to a barbarous state. He emphasised the fact that this theory did not interfere with the beautiful law of evolution; it did not touch the question as to how the high state of civilisation from which they had fallen had been reached; the fact being that they were on the down grade and needed a gospel of salvation. He then referred to some of the marvellous changes produced in villages and towns by Christianity, and declared his strong faith in the simple, pure gospel of Jesus Christ, as being the power needed at home and abroad to produce those reforms that begin inwardly and work outwardly the truest and best of all reforms.

Sir WILLIAM MACGREGOR, M.D., Administrator of British New Guinea, addressed the Society on "The Geography, Progress, and Value of this British Dependency" (see page 271, vol. X).

The addresses were illustrated with maps presented by the Royal Geographical Society, MSS., and lantern views from photographs taken by Sir W. Macgregor in his travels in the island. There was a large attendance of members, and at the close of the addresses questions were asked and replied to.

Sir Frank Lockwood was elected a Vice-President of the Society on the motion of the CHAIRMAN of the Council, seconded by Mr. J. D. WILDE.

Very hearty thanks were tendered to the Lord Mayor for the use of the room, to Alderman Thompson for presiding, and to Sir William Macgregor and Dr. Macfarlane for their interesting and valuable addresses; and pleasure was expressed at the presence of the Lady Mayoress and Lady Macgregor.

The 330th Meeting was held at the Society's House, on Friday, March 8th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Sir William and Lady Macgregor, the Rev. S. Macfarlane, Lady Bosdin Leech, the Chairman, and other members of the Council held a reception of the members.

A collection of New Guinea curiosities and photographs, maps, and books were exhibited. The lantern slides were again shown, Sir W. MACGREGOR explaining some of them and the Rev. Dr. MACFARLANE described, the rest, entering with some detail into the question of house building, wood carving, decoration of woven fabrics and of the person, manners, customs, and beliefs of the natives.

Sir W. MACGREGOR thanked the Society for his election as an Honorary Member and for the kind appreciation of his address. Dr. MACFARLANE very ably described a large number of lantern views of scenery, the people, the beautiful carvings and the artistic products of the natives.

The 331st Meeting of the Society was held at the Society's House, on Wednesday, March 13th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

The minutes of meetings held March 8th (329th and 330th) were read and approved.

The election of the following members was announced:—

ORDINARY: Sir Frank Lockwood (Solicitor-General) and Mr. Samuel Chatwood, F.R.G.S.

The presentations to the Library were brought before the members, and considerable correspondence was read. The Secretary brought Mr. Mortimer's book on Cotton Spinning to the notice of the meeting.

Mr. J. D. WILDE, M.A. (Hon. Sec.) read a communication from the Hon. J. V. Brower, of St. Paul, Minn., on "Lake Itasca and the Upper Waters of the Missis-

sippi," and exhibited the collection of photographs, sketches of prehistoric relics, and maps sent by Mr. Brower to illustrate his paper.

After some discussion, Mr. SCHOLFIELD moved and Mr. SNADDON seconded, a vote of thanks to Mr. Brower and to the reader of the paper.

Communications were read from the President of the Royal Geographical Society and the Director of Military Intelligence on questions to be raised at the Geographical Congress.

The forthcoming excursions of the Society were referred to.

The 332nd Meeting was held at the Society's House on Monday, March 18th, 1895, at 6-30 p.m. The Rev. S. A. STEINTHAL in the chair.

The escape of Slatin Bey having been reported, letters of congratulation were ordered to be sent to him and to Major Wingate.

The Chairman received the members, and music was rendered by Miss A. Willoughby, Mr. J. D. Wilde, and Mr. T. P. Cooper, and light refreshments were provided.

Mrs. UNSWORTH read a paper on "Siam from a lady's point of view."

Questions were asked and replied to, and Mrs. LEO GRINDON proposed a vote of thanks to Mrs. Unsworth for her paper, and to Captain Unsworth for his valuable gift of Pali MSS; Mr. J. E. PALMER seconded the vote, and it was supported by Mr. J. IRLAM, the SECRETARY, and others.

Mrs. UNSWORTH replied and indicated that she might communicate with the Society from time to time on her return to Siam.

The 333rd Meeting was held in the Society's House on Wednesday, March 27th, 1895, at 7-30 p.m. The Chevalier R. FROEHLICH in the chair.

It was proposed by Mr. J. D. WILDE, seconded by Mr. J. HOWARD REED, and carried, that Mr. T. Gregory, F.C.A., and Mr. W. Aldred, F.C.A., be appointed auditors of the accounts for 1894.

Mr. E. DELMAR MORGAN, F.R.G.S., addressed the Society on "Arctic Exploration." The address was illustrated with lantern slides of maps prepared by the "Victorians," and with a map prepared specially by Mr. G. H. Warren.

After discussion a very hearty vote of thanks was proposed by Mr. WARREN, seconded by Mr. ROSHKOFF, of Moscow. Mr. DELMAR MORGAN responded.

The 334th Meeting was held at the Society's House on Friday, March 29th, 1895, at 6-30 p.m., at the invitation of the "Victorians." Mr. J. HOWARD REED, the honorary secretary, in the chair.

A selection of music was rendered by several ladies and gentlemen, and Mr. REED gave an account of the work of the "Victorians" during the winter.

A very pleasant evening was spent and thanks were given to those who had contributed.

REPORT OF THE SECRETARY TO THE COUNCIL OF THE MANCHESTER GEOGRAPHICAL SOCIETY FOR THE YEAR 1894.

16, St. Mary's Parsonage,
Manchester,

MY LORDS, LADIES, AND GENTLEMEN,

I have the honour to present to you the following Report of the Society's work for the year 1894 :—

Forty-one meetings of the Society have been held.

Large as this number is, the "Victorian" addresses, numbering nearly one hundred, should be added thereto to obtain an idea of the great amount of work achieved by the Society.

For some weeks at the close of the year it was necessary to suspend the meetings, owing to the removal of the Rooms of the Society to the present premises.

The correspondence of the Society with its members at home and abroad, with foreign geographers, and the large number of Corresponding Societies, continues to be useful, interesting, and valuable.

The Society has contributed again this year half the stipend of the Lecturer in Geography at Owens College, the Royal Geographical Society contributing the other moiety. Mr. A. J. Herbertson is the new Lecturer, and we all hope he will have great success in the office, which is not without considerable difficulty.

About seventy addresses have been given to the members. The principal subjects are hereafter given. In addition thereto, Reports of Delegates at various meetings, and of the Examiners of the Geographical Examination in Secondary Schools, have been read, imparting a considerable amount of valuable information.

We very much regret the loss of the following members by death, and the numerous deaths of the members make a marked loss in the income of the Society :—

Amongst a large number of others—

Mr. James Horrocks.
„ Hilton Greaves, J.P., D.L.
„ Thomas Aldred, F.C.A.
The Right Hon. Lord Aberdare.
Ald. J. Sidebottom, J.P.

Mr. J. L. Kennedy, J.P.
Ald. C. Makinson, one of the Trustees.
Mr. T. W. Clemson.
Mr. B. O'Connor.
Mr. H. H. Entwistle.

It is a hard struggle to fill up their honoured places in the ranks of the Society. Without increasing the number of the members, we require to have fifty to sixty new members every year to take the places of those lost to us.

A small loss has been made on the year's working, as will be seen by the Balance Sheet, which is appended hereto and has again been audited by our Honorary Auditors—Messrs. W. Aldred, F.C.A., and Theodore Gregory, F.C.A.

A new departure has been made by the election of a Local Committee at Stockport, presided over by the Rev. Canon Symonds, with Mr. T. H. Rathbone as Honorary Local Secretary. Several meetings have been held, which have been successful, and the experiment is being anxiously watched in the hope that if this Committee is successful other towns may be induced to form Local Committees.

The New Rules of the Society, which were passed at the Town Hall last October, have been duly registered, and the Society is now therefore a "Registered Literary or Scientific Society."

Several receptions of the members have been held during the year, and with the new rooms in use the Council will be able to make these very pleasant meetings a feature of the social side of the Society's work.

The Society was very kindly received at Chomlea by Mr. and Mrs. Benjamin Armitage.

A very pleasant feature at one of these meetings was the distribution of an Italian spiced cake, sent by Major Casati through Chevalier Froehlich.

The "Victorians" again offered their hospitality to the small children of the members, and the meeting was very much enjoyed.

The cost of setting out the Society's new rooms and offices has been large, and there will be plenty of room for the members to display their generosity.

With the new rooms and the map room properly fitted up the Society should enter upon a period of great usefulness.

The ten years of weary drudgery in the attic in Brown Street have at length come to an end. The dream prefigured by the late Mr. J. H. Hutton is now partly fulfilled, and none would have been more delighted than he if he could have seen our new premises. Whilst they are not all that could be desired, they are yet a very great advance upon the accommodation we had. We can at least now get to our possessions, and members are continually expressing themselves surprised at the wonderful collection of books, maps, and of curiosities, which has been patiently collected and hitherto hidden away.

There are several departments of work the Society should enter into and will as soon as the finances of the Society will permit; but until a larger accession of members is made, the present income is too small to permit of any extension of work, as it is difficult to continue that at present in hand.

The questions of reports from foreign markets, of the opening of new ones, of fresh raw materials for the use of manufacturers, of emigration and migration, practical reports from the Society's agents on the requirements of the Colonies and of the British Dependencies are all of great value which cannot with our present income be dealt with.

The Society has, no doubt, in the last ten years given an enormous impetus to the study of geography, more especially on the commercial side, and has been enabled to place before its members a very large amount of valuable commercial information, and this it has been very careful to do in a way that should safeguard all existing interests; but much more than that is required to be done, and it is to be hoped that it may be enabled to accomplish some portion at least of this larger work.

This Report should not close without distinct reference to the valuable work of the "Victorians," whose work is seen in the *Journals* of the Society—particularly in the analysis of the contents of foreign geographical journals, a task of great labour but of very great value. This particular work is being copied very largely in other journals, and has evoked great commendation both at home and abroad.

The "Victorians" also have drawn diagrams and maps, have made large numbers of photographs, and lantern slides from diagrams and original photographs, and in many ways have helped those who have addressed the Society. They have also given large numbers of lectures and have placed the Society under very great obligations for their untiring and unselfish labours. Their labours have been

given to the Society freely, and they could not be bought. Mr. J. Howard Reed has made a special report which is here appended.

The *Journal* is being steadily printed and issued, and the only reason it is not now published up to date is not lack of matter but shortness of funds.

This is a noble record of work done, in which all our members have an interest if they have not personally taken part in it. It has also been of service to large numbers of persons who are not members, and is a fair claim for hearty and generous consideration of the Society by those who have not yet joined it. If the members wished it, their number might be doubled in a month, and all those dragging and irritating difficulties would vanish like snow before the noonday sun.

The following are the principal papers read to the Society during the year :—

EUROPE.

A Summer Holiday in Kent and Sussex. Mr. J. C. Blake, F.R.G.S.
 A Ramble in Portugal with a Camera. Mr. G. W. Mellor, J.P., F.R.G.S. &c.
 Tenby (Notes on). Mr. J. Howard Reed.
 Iceland Exploration. Mr. F. W. W. Howell, F.R.G.S.
 The Tidal Waves in the Wye and Severn. Mr. W. N. Greenwood.
 South Devon and Cornwall. Mr. J. D. Wilde, M.A.
 The Gardens of Norcliffe, Styal and the Valleys of the Goyt, Etherow, and the Bollin.
 The Secretary.
 Blackstone Edge and the Old Road. The Secretary.
 Notes on a Visit to Switzerland. Mr. A. Bowes.

ASIA.

Afghanistan. Dr. J. A. Gray.
 The Siege of Delhi. General Lord Roberts.
 Dardistan. Dr. Leitner.
 The Ghona Lake. Dr. Casartelli.
 The Holy City of the Manchus (Moukden). Mr. Bishop. Illustrated.
 China. Rev. S. A. Steinthal.
 Japan. Mr. J. Howard Reed.
 Corea. Mr. A. J. Herbertson (Lecturer in Geography at Owens College) and Mr. C. H. Bellamy.
 Early Maps of China in the Berlin Geographical Society's Atlas. Mr. A. J. Herbertson.
 The Work of the Palestine Exploration Fund. Lieut.-Col. C. M. Watson Pasha, R.E., C.M.G.
 The Akkas-Haifa Railway Proposal. The Secretary.

AFRICA.

The Highlands of South Africa. Mr. A. R. Colquhoun, A.M.I.C.E., F.R.G.S.
 The Suakim Berber Route to the Soudan. Lt.-Col. C. M. Watson Pasha, C.E. Colonel Provost, and Mr. A. B. Wyld.
 The Re-opening of the Soudan to Trade. Mr. Frank Spencer.
 The Action of the Congo Free State in Restraint of Trade. Mr. R. E. Dennett.
 Masasi. Rev. W. Porter, M.A.
 Lake Nyasa Railway. British East Africa. Mr. George S. Mackenzie.

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Letters from Machakos. Mr. J. Ainsworth.

East Africa. Rev. J. Wakefield, F.R.G.S., F.R.H.I.

The Hausa Language and People. Liberia and her Critics. The Campaign of Baron Dhanis against the Slavers of Central Africa, and his return to Europe. The Rev. L. C. Casartelli.

Meteorological Observations in British East Africa. Mr. G. Ravenstein, F.R.G.S.

Meteorology at the Cape of Good Hope. Dr. J. M. Black.

Forecasting Weather at the Cape. Dr. Black.

The Uganda Experiences of Mr. F. C. Smith. Mr. J. Howard Reed.

AMERICA.

Chicago and the World's Fair. The Chairman.

A Geographical Day at the San Francisco Exhibition. The Secretary, Geographical Society of Pacific.

Across the Rocky Mountains. Mr. C. A. Bellamy.

Canada. Lord Derby.

AUSTRALASIA.

Fiji. Mr. J. P. Thomson, F.R.G.S.A.

Polynesian Labour Traffic.

ARCTIC AND ANTARCTIC.

Arctic Discovery. Paper prepared by a Student of Ushaw College.

Animal Life observed During a Voyage to Antarctic Seas. Mr. W. S. Bruce.

The Voyages of Hall, Nares, Greely and Peary. Professor Guido Cora.

Captain Haserick's Proposal for the Exploration of Ellesmere Land.

Arctic Exploration. Mr. G. H. Warren.

GENERAL.

The True Horizon of the Mammoth. Mr. Mark Stirrup, F.G.S.

Prince Henry the Navigator. The Chairman.

Oak Silk Spinners (Chinese and Japanese silk worms): Their Natural History and Commercial Value. Mr. Sigetzvary, Newchang.

The Past History of Israel. Mr. B. I. Belisha.

Geographical Excursions of the Scholars—German Schools. The Secretary.

Classic Dancing, Romany Tribal Dancing, Spanish Dancing. Papers by Mr. J. D. Wilde, M.A. Illustrations by Miss Carie Moore.

The Round World, Volcanoes, Water Sculpture. Children's Lectures. Mr. J. D. Wilde, M.A., and the Secretary.

The Art of Cartography—The Planisphere. Mr. H. T. Crook, C.E.

Ditto ditto. Elevation. Ditto.

Valley Forming, as exhibited in Derbyshire. Professor W. Boyd-Dawkins, F.R.S.

EDUCATIONAL.

Stegemeir's Maps for Geographical Study and Record. The Secretary.

Geography as Part of Technical Education. Mr. J. Thomson, F.R.G.S.A.

The Examination in Geography. Report of the Examiners.

Receptions were held in the new rooms on January 26th and December 12th.

A general meeting of the Stockport Local Committee was held under the presidency of the Rev. Canon Symonds on September 5th, 1894, when arrangements for carrying on the work at Stockport were made.

The following are the more important excursions made by the members during the year, the list of places to be visited having been settled at a meeting held on the 28th March :—

Manchester Ship Canal, ss. "Athlete."

Macclesfield, Prestbury, Marton, Capesthorpe, Monk's Heath, Birtles.

To Lymm by Ship Canal.

Barlow Moor Hall and the Crematorium.

Along the Ship Canal by steamship.

Styal and Norcliffe Gardens.

Taxal and Kettleshulme.

Blackstone Edge.

Peel Park Art Gallery and Jubilee Exhibition of Pictures.

Report of party of members to Switzerland and the Lakes of Italy read.

Disley and Lyme Hall.

The Park, Prestwich, and the Irwell Valley.

Electrical Works of the Manchester Corporation.

Knowsley Hall and Park.

Prescot Watchmaking Company.

The Hydraulic Works of the Manchester Corporation.

Hope and Castleton.

Parties of members arranged for to Norway and a large number of members who have been assisted in their Continental journeys.

The following delegates' reports have been read :—

Tenth International Orientalist Congress at Geneva—delegate, Rev. L. C. Casartelli.

British Association Meeting at Oxford—the Secrerary.

The Yorkshire Mechanics' Institute Union Annual Meeting—the Secretary.

The Lancashire and Cheshire Union Annual Meeting—the Chairman.

Very hearty thanks have been tendered to all those who have so generously assisted the Society during the year by gifts of money, books, maps, curiosities, photographs, pictures, and by personal service freely given and heartily appreciated.

So large a number of illustrations have indeed been given to the Society of native work and curiosities that a very substantial foundation has been laid for the Museum Department of the Society. We are the possessors of a Caledonian Islands' loom, of weapons from East Africa, the Cameroons, the Upper Waters of the Amazon, Japanese and Chinese art work, and a variety of other interesting specimens, which will fall into their proper place as our collection of these things becomes larger. It may be well to remind the members that any specimens of native arms, or productions, may not be very valuable in themselves, but are very valuable when they are made to form a part of an ordered collection. We shall be very glad to receive further contributions.

ELI SOWERBUTTS, F.R.G.S.,

SECRETARY.

GENERAL BALANCE SHEET, DECEMBER 31st, 1894.

| ASSETS. | | LIABILITIES. | |
|--|----------|---|----------|
| | £ s. d. | | £ s. d. |
| To Arrears of Members' Subscriptions | 173 5 0 | By Twenty Life-Membership Subscriptions in reserve .. | 210 0 0 |
| " Stock of Journals | 73 0 0 | " Subscriptions paid in advance | 22 11 6 |
| " Lantern and Slides Account:— | | " Geographical Lecture Fund | £5 17 1 |
| Balance from 1893 | £9 15 9 | Less Owing to General Fund | 0 19 6 |
| Further Expenditure, 1894 | 10 14 11 | | 4 17 7 |
| | | " New Premises Account | £26 15 6 |
| | £20 10 8 | Less Owing to General Fund | 22 4 5 |
| Less received from Victorians | 16 0 0 | | 4 11 1 |
| | 4 10 8 | " Sundry Accounts Outstanding | 129 6 |
| Amounts owing for Advertisements | 11 1 3 | | |
| " Lecture Expenses | 10 13 0 | | |
| Cash in hand, General Account:— | | | |
| In Bank | £25 2 3 | | |
| In Secretary's hands | 1 3 6 | | |
| | 27 5 9 | | |
| Cash in Bank—Lecture Fund Account | 5 17 1 | | |
| " New Premises Account | 26 15 6 | | |
| | | | |
| Total | £332 8 3 | | |
| Balance of deficiency from 1893 | £22 3 1 | | |
| Add Balance of Revenue Account, 1894 | 16 16 4 | | |
| | 38 19 5 | | |
| | £371 7 8 | | £371 7 8 |

The above Accounts are exclusive of Furniture, Fixtures, and Library.

Nov. 6th, 1895.

Audited and found correct,

THEODORE GREGORY, F.C.A., }
WILLIAM ALDRED, F.C.A. } Hon. Auditors

REPORT OF THE "VICTORIANS."

SESSION, 1894-95.

The "Victorians" have again pleasure in reporting upon an extensive and successful winter's work. They believe that their efforts in the past have done much to popularise the science of Geography in its various branches, and they are, moreover, of opinion that there is scope for very much more to be done in this direction in the future.

The delivery of lectures has now become one of the most important functions of the Society itself. The affiliated societies, and the local committees which have been formed, and which are now likely to increase in number, look for the carrying on of this work. The lecturing has grown to be a heavy task, as will be seen from the following paragraphs. The "Victorians" have been obliged, therefore, to avail themselves largely of the services of members of Council, and others, as public lecturers.

The lecturing work of the past season has not only been most successful but has increased very considerably over past years, and there seems every prospect of its increasing still more in the future. During the season of 1892-93 thirty-eight lectures were given; in 1893-94 they increased to sixty-two; but during the winter of 1894-95 no less than ninety-four meetings have been addressed by our lecturers. The details of these meetings are set out fully in the accompanying tabulated statement.

"VICTORIAN" LECTURES—1894-1895.

| Date. | Place. | Subject. | How Illustrated. | On Behalf of | Remarks |
|---------|-----------------------|----------------------|------------------|-----------------|----------------------------|
| 1894. | | | | | |
| June 14 | Winsford | Co-operation | | A Member | |
| Aug. 19 | York St., Cheetham | | | Members | Sunday Address |
| Sept. 2 | Oldham Road | | | Do. | Do. |
| 16 | Eccles | | | A Member | Do. |
| 27 | Knutsford | University Mission | | Do. | |
| 28 | Tenby | Lakes of C. Africa | Lantern Slides | Members | Local Lantern Soc's Slides |
| Oct. 9 | Dobcross | British in S. Africa | Do. | Do. | Soc's Lantern and Slides |
| 9 | Burnley | Maps | Do. | Afil. Soc. | Society's Slides |
| 13 | Harpurhey | Geography | | A Member | |
| 16 | Middleton | England to Japan | Do. | W.M.Clubs' Ass. | Soc's Lantern and Slides |
| 17 | Winnington, Northwich | Canada | Do. | A Member | Society's Slides |
| 18 | Preston | Across Africa | Do. | W.M.Clubs' Ass. | Soc's Lantern |
| 21 | York St., Cheetham | Egypt | Map | A Member | Sunday Address |
| 25 | St. John's, L'sight | The Congo | Lantern Slides | Do. | Society's Slides |
| 28 | Newton Heath | | | Do. | Sunday Address |
| 29 | York St., Cheetham | Uganda | Maps | Members | |
| Nov. 4 | Do. do. | Do. | Do. | Do. | Do. |
| 6 | Rochdale | Polar Exploration | Lantern Slides | W.M.Clubs' Ass. | Soc's Lantern and Slides |

"VICTORIAN" LECTURES—1894-1895.—CONTINUED.

| Date. | Place. | Subject. | How Illustrated. | On Behalf of | Remarks. |
|---------|----------------------------|--|--|--------------------|-----------------------------|
| 1894. | | | | | |
| Nov. 6 | Whalley Range | The Congo | Maps | A Member | |
| 8 | Salford Mission | Columbus | Lantern Slides | Do. | Society's Slides |
| 12 | Merthyr | Chicago | | Do. | |
| 13 | Salford Free Lib. | Iceland | Do. | Afil. Soc. | Soc's Lantern |
| 14 | Eccles | Canada | Do. | Do. | and Slides |
| 17 | Oldham Free Lib. | Palestine | Do | Do. | |
| 17 | Stockport | China, Japan, and
Corea | Do. | Local Com. | Society's Slides |
| 19 | Meltham | Columbus | Do. | Afil. Soc. | Do. |
| 19 | Liverpool | Maps | Do. | A Member | Do. |
| 24 | Oldham Free Lib. | China, Japan, and
Corea | Do. | Afil. Soc. | Do. |
| 27 | Salford Free Lib. | Do. | Do. | Do. | Soc's Lantern |
| 28 | Lees | Across Africa | Do. | A Member | and Slides |
| 30 | Hazel Grove | Do. | Do. | Do. | Do. |
| Dec. 3 | Oldham | England to Japan | Do. | W.M.Clubs'
Ass. | Do. |
| 3 | Leigh | Iceland | Do. | Afil. Soc. | Do. |
| 4 | Meltham | Do. | Do. | Do. | |
| 4 | Winnington,
Northwich | The Congo | Do. | A Member | Society's Slides |
| 6 | Rochdale | England to Japan | Do. | W.M.Clubs'
Ass. | Soc's Lantern
and Slides |
| 10 | Brooklands | Across Africa | Do. | A Member | Do. |
| 11 | Salford Free Lib. | Nansen and the
North Pole | Do. | Afil. Soc. | Do. |
| 13 | Heywood | China, Japan, and
Corea | Do. | A Member | Do. |
| 15 | Stockport | Nile Discovery | Do. | Local Com. | Society's Slides |
| 18 | Coupland Street | Polar Exploration | Maps | A Member | |
| 18 | Oldham | England to Japan | Lantern Slides | W.M.Clubs'
Ass. | Do. |
| 19 | Winnington,
Northwich | Solar System | Foucault Ex-
periment &
Diagrams | A Member | |
| 19 | Brook Street | Uganda | Maps | Do. | |
| 22 | Oldham Free Lib. | Nile Discovery | Lantern Slides | Afil. Soc. | Do. |
| 22 | Parsonage | A Round Globe | Do. | Children of | |
| 26 | Do. | Volcanoes, &c. | Do. | Members | |
| 28 | Do. | Water Carving | Do. | Do. | |
| 29 | Cotton Waste Ex-
change | Children's Annual | | Do. | |
| 1895. | | | | | |
| Jan. 10 | Mossley | Border Lands of
China, Russia,
and England | Map | W.M.Clubs'
Ass. | |
| 12 | Stockport | Polar Exploration | Lantern Slides | Local Com. | Society's Slides |
| 14 | Collyhurst | British C. Africa | Maps | A Member | |
| 15 | Salford Free Lib. | California | Lantern Slides | Afil. Soc. | Soc's Lantern
and Slides |
| 16 | Winnington,
Northwich | Australia | Do. | A Member | Society's Slides |
| 21 | Rochdale | Across Africa | Do. | W.M.Clubs'
Ass. | Soc's Lantern
and Slides |
| 22 | Heywood | Columbus | Do. | A Member | Society's Slides |
| 24 | Salford Mission | Across Africa | Do. | Do. | Do. |
| 28 | York St., Cheetham | Geography and
Missions | Maps | Do. | |
| 29 | Mottram | Liverpool to San
Francisco | Lantern Slides | W.M.Clubs'
Ass. | Soc's Lantern
and Slides |
| 30 | Ardwick | England to Japan | Do. | A Member | Do. |
| Feb. 6 | Heywood | Water Action | Do. | Do. | Society's Slides |
| 9 | Stockport | British in S. Africa | Do. | Local Com. | Do. |
| 11 | Clayton-le-Moors | Across Africa | Do. | W.M.Clubs'
Ass. | Do. |
| 11 | Oldham | Liverpool to Van-
couver | Do. | Do. | Soc's Lantern
and Slides |
| 12 | Salford | Suez Canal | Do. | Afil. Soc. | Do. |
| 13 | Winnington,
Northwich | Polar Exploration | Do. | A Member | Society's Slides |
| 13 | Hull | Rocky Mountains | Do. | Do. | |
| 15 | St. Luke's, C'tham | Uganda | Maps | Do. | |
| 18 | Meltham | Paris to Moscow | Lantern Slides | Afil. Soc. | Do. |

"VICTORIAN" LECTURES—1894-1895.—CONTINUED.

| Date. | Place. | Subject. | How Illustrated. | On Behalf of | Remarks. |
|---------|-------------------------|-------------------------|------------------|------------------|--------------------------|
| 1895. | | | | | |
| Feb. 18 | Reddish | Across Africa | Lantern Slides | W.M.Clubs' Ass. | Society's Slides |
| 21 | Great Moor | Polar Exploration | Do. | A Member | |
| 21 | Ashton | Across Africa | Do. | W.M.Clubs' Ass. | Soc's Lantern and Slides |
| 24 | New Brighton | Rocky Mountains | Do. | A Member | |
| 24 | Bowdon | British S. Africa | Do. | Do. | Society's Slides |
| 24 | Crompton | Polar Exploration | Do. | W.M.Clubs' Ass. | Do. |
| 24 | St. Stephen's, C.-on-M. | Nile Discovery | Do. | A Member | Do. |
| 26 | Salford Free Lib. | Rocky Mountains | Do. | Affil. Soc. | Soc's Lantern |
| Mar. 6 | Eccles | England to Japan | Do. | Do. | Soc's Lantern and Slides |
| 9 | Stockport | Maps | Do. | Local Com. | Society's Slides |
| 11 | Leigh | China, Japan, and Corea | Do. | Affil. Soc. | Do. |
| 14 | St. Luke's, C'tham | Polar Exploration | Map | A Member | |
| 14 | Stockport | Water Action | Lantern Slides | Local Com. | Do. |
| 16 | Oldham Free Lib. | Maps | Do. | Affil. Soc. | Do. |
| 19 | Middleton | Polar Exploration | Do. | A Member | Do. |
| 20 | Winnington, Northwich | India | Do. | Do. | Do. |
| 21 | Salford Mission | Polar Exploration | Do. | Do. | Do. |
| 26 | Hyde Road | Rocky Mountains | Do. | Do. | |
| 31 | Oxford Road | | | Do. | Sunday Address |
| April 7 | | | | Do. | Do. |
| 14 | | | | Do. | Do. |
| 28 | Oxford Road | British C. Africa | Map | Do. | Do. |
| May 5 | Rochdale | | | Do. | Do. |
| 12 | Oxford Road | | | Do. | Do. |
| | Newcastle-on-Tyne | Sweden | Lantern Slides | Tyneside Society | |

Most of the meetings were well attended, many by crowded audiences. In two or three cases only the audiences were disappointingly small. The "Victorians" feel that it is hardly fair for members to invite their lecturers to address meetings without they in turn are prepared to do their part by ensuring gatherings of encouraging and satisfactory proportions.

It will be observed that six of the lectures in question were given as a series on behalf of a local committee of our members at Stockport. All these meetings were a great success and were attended by large and appreciative audiences. Sir Joseph Leigh, M.P., presided over the first, and the Mayor of Stockport, Alderman Robinson, presided on two other occasions. This experiment has proved so successful that it is hoped similar local committees will be formed by our members in other districts, and meetings organised.

A series of six geographical lectures was again given at Winnington Schools, Northwich, at the request of our member, Mr. Edward Milner, J.P. The "Victorians" believe this to be a very valuable class of work and would like to extend their usefulness in this direction.

Four geographical lectures were given to the children of our members. Three of these meetings were held in the Library and the other took the form of a geographical lantern entertainment and formed one of the features of the Christmas gathering of children referred to below.

Eighteen lectures were given on behalf of the affiliated societies at Burnley, Eccles, Leigh, Meltham, Oldham, and Salford, at all of which places large and attentive audiences were gathered.

During the winter fourteen meetings were addressed on behalf of the Working Men's Clubs Association. The places visited under these auspices were Ashton-under-Lyne, Crompton, Clayton-le-Moors, Middleton, Mossley, Mottram, Oldham, Preston, Reddish and Rochdale. All of these meetings were highly successful.

Besides the meetings detailed above forty-six others were addressed at various places at the request of members of the Society. The places visited included Bowdon, Brooklands, Dobcross, Eccles, Great Moor, Hazel Grove, Heywood, Hull, Knutsford, Lees, Liverpool, Middleton, Merthyr, Newcastle, New Brighton, Rochdale, and Tenby, besides the home district of Manchester. Twelve of the above were missionary addresses given on Sundays.

No less than sixty-eight of the lectures given, as detailed in the preceding paragraphs, have been illustrated with lantern views. In fifty-seven cases the lantern slides have been provided by the Society, and on twenty-seven occasions we have also supplied the lantern and other apparatus. Thirteen of the addresses have been illustrated by maps and diagrams prepared by the "Victorians." It will be seen that by means of these meetings the knowledge and influence of our Society has been spread over a very wide field. From Newcastle to Merthyr and Tenby, from Hull to Liverpool and New Brighton.

Many of the meetings held have been well reported in the local papers, and the Honorary Secretary has received many letters expressing appreciation of, and thanks for, the services of our lecturers.

The "Victorians" wish to express their thanks to the Chairman, the Honorary Secretaries, and several other members of the Council, as well as to some private members of the Society, for the very valuable assistance they have given in making the season's lecturing work so successful. They would especially thank Mr. Thomas Weir, Honorary Secretary British Astronomical Society (Northern Branch), who, at considerable trouble prepared and delivered at Northwich a valuable astronomical lecture: "The Sun and his Family." The value of this address was greatly enhanced by the fact that it was splendidly illustrated by some beautiful and very graphic diagrams, and by Foucault's pendulum experiment. Mr. Weir may be gratified to know that his labours were greatly appreciated by the authorities at Northwich, and equally so by the students he addressed.

The Secretary of the Society, Mr. Eli Sowerbutts, who, as it is well known, was the pioneer of the "Victorian" lecturing work, has once more done yeoman service for the cause. He again heads the list in the number of lectures delivered. The "Victorians" thank him for his devotion, and they feel sure that in doing so they will not only express the general sentiment of the members of this Society, but also that of all lovers of Geography. The writer wishes especially to place on record his personal thanks to Mr. Sowerbutts for having, on more than one occasion, at very short notice, taken his place as lecturer when he has been unable to fulfil his engagements, owing to a period of domestic affliction.

At the end of the year 1894, the "Victorians" were again able to hand over to the Treasurer the sum of £16, the balance of the small fees charged for their numerous lectures. Out of this money the Society have already largely increased their number of lantern slides, and these will, it is hoped, be much used in the coming winter.

The usual children's party was held during the Christmas week at the Cotton Waste Exchange, and was again a great success. A large number of the children of the members took part in it, and evidently enjoyed themselves to the full. Mr. G. A. Irlam again very kindly entertained the little folks with a very clever conjuring and ventriloquial exhibition, which was much appreciated and enjoyed. The

"Victorians" offer him their very hearty thanks. They would also thank those ladies and gentlemen who helped in the provision and distribution of the creature comforts of the evening, as well as for the toys and curios which they presented to the children.

At the close of the lecturing season the "Victorians" held a musical "at home," or smoking concert, in the Library, by permission of the Council, and a very pleasant evening was spent by those ladies and gentlemen who, during the winter, had contributed to the success of the "Victorian" work of the session.

During the year the British and Foreign journals added to the Library have been gone through, and the analysis prepared as usual. This will in due course appear in the *Journal*.

A number of photographs have been taken, and a considerable number of lantern-slides made during the year.

Several large diagrams for lecturing purposes have also been prepared.

The writer of this report would again draw the attention of the members to the very valuable and self-sacrificing work which is carried on by one of the "Victorians" in the able manipulation of the lantern, not only at the Society's meetings on our own premises, but also at a very much larger number of meetings held in the surrounding districts. It is felt that the members hardly realize how much they owe to the enthusiastic devotion of one who works with untiring zeal for the general good in a most retiring and unostentatious manner. The service is an invaluable one, and each individual member is greatly indebted to the gentleman in question for his devoted and gratuitous work.

It is hoped that the Council of the Society, and the members generally, will consider the foregoing a satisfactory record of work done for the cause of Geography.

J. HOWARD REED, Hon. Secretary.

56, Ducie Grove, Manchester, July, 1895.



VIEW OF THE NEW PREMISES OF THE SOCIETY
FROM SOUTH PARADE.

THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY.

SOUTHERN SWEDEN, 1894.

By MR. EDWARD W. MELLOR, J.P., F.R.G.S., F.LINST.

[Addressed to the Members in the Memorial Hall, Monday, February 4th, 1895.]

THE tourist, when paying a visit to the Scandinavian Peninsula, as a rule devotes his time and attention to Norway, the western portion of that peninsula, and rarely sees more of the eastern portion, Sweden, than is permitted by a rapid passage through Gothenburg, and perhaps Stockholm, on his way to Christiania.

And yet in Sweden, especially in its southern provinces, with its well-timbered hill-sides, its numerous lakes and winding rivers, its forests of fir and silver birch, there is very much that is beautiful to the lover of Nature. There is also very much of the deepest interest to the student of antiquity, for here the geologist and the archæologist have been able to trace out in a remarkably connected manner, and to read with an astonishing degree of certainty, the history and habits of primitive man long prior to the period of any written chronicle.

The remark, then, which we sometimes hear applied to other lands, that "their history in the remote ages lies buried in obscurity," no longer applies to Southern Sweden, for the story of those remote centuries has revealed itself to the scientist.

We will glance for a moment at the geographical aspect of Southern Sweden.

It is an ascertained fact that at the early period of the earth's history, known to geologists as the Quarternary or Glacial Epoch, the whole of Scandinavia was under ice. The scraping, erosive, glacial action is abundantly shown upon her rocks.

VOL. XI.—NOS. 4-6—APRIL TO JUNE, 1895.

With the melting of the ice, the waters flowing from the chain of mountains which divides Sweden from Norway sought their readiest course to the sea, on the more precipitous Norwegian side, falling to the Atlantic through lofty cascades, boisterous torrents, and grand fjords, so familiar to the visitor to Norway—the waters in so great a hurry, so to speak, that with one or two exceptions they have not time to form a lake; but we find a different state of things on the Swedish side of the



peninsula. Here the land slopes from the dividing range more gently over a broader tract of country to a land-locked sea—the Baltic and Gulf of Bothnia. The waters then, falling more gradually, had time to find out and fill up the hollows in the land, and Sweden is left a country full of meandering streams and innumerable lakes of all sizes, from small sheets of water, scarcely large enough to boat upon, to huge inland seas like the Mälaren Lake with an area of 668 square miles, Lake Wetter with an area of 733 square miles, and Lake Vener with an area

of 2,386 square miles—lakes which take a whole day for a fast steamboat to traverse.

So numerous are the lakes, especially in the Province of Södermanland, that the Swedes have a saying that "When God separated land from water, He forgot Södermanland."

There was, however, a time when these great lakes did not exist as lakes, but the water here was an arm of the sea, or strait, which connected the Baltic with the Atlantic, and which separated the south of Sweden from the rest of the peninsula.

The formation of these great lakes is due to some upheaval of the earth's crust, which retained large expanses of water in the depressions or hollows of the uplifted land. Thenceforward these lakes have been maintained by waters received from the neighbouring higher grounds, and they in turn feed rivers flowing to the lower levels.

A proof of this upheaval is found in the fact that fossils of marine creatures have been discovered in the tract of land between the lakes and the sea. When the upheaval closed the primæval strait, the only connection between the Baltic and the Atlantic was by means of the Skager-rack and the Kattegat through the narrow channel of the Sound.

There are some phenomena in connection with the Baltic well worth a passing notice.

The Baltic, instead of being higher than the North Sea, as was formerly believed to be the case, is found to be of the same level; there is therefore no flow of water either way due to difference in levels. But the Baltic receives an immense volume of water from the large rivers of North-west Russia, and from upwards of 200 other streams of all sizes; consequently the surplus of waters not lost by evaporation must make its way out to the North Sea through the Sound; a sluggish current into the Kattegat has accordingly been found. There is, then, a constant circulation of fresh water from the rivers through the Baltic, and as this has been going on for thousands of years we might naturally have expected that the Baltic would have become a gigantic fresh-water lake. How, then, does the Baltic Sea retain its saltiness?

This is the explanation: There is a double current. A current of more salt, and consequently denser water, flows through the Sound from the Kattegat to the Baltic underneath, and at a lower level than, the outflowing current of lighter and more brackish water from the Baltic. A proof of this is found in that a vessel of light draught is more easily propelled into the Kattegat, being assisted by the upper outflowing current, than is a vessel of deeper draught whose hull penetrates into the lower insetting current, which retards the vessel's outward course, but has no influence upon the smaller light draught vessel. We may also expect to find that the water nearer the

North Sea, the salt supply, will be more salt than the water on the eastern coasts of the Baltic nearer to the mouths of the Russian rivers. Analysis proves this to be the case, and enables us to trace the salting of the water, if I may use the term, all the way along—*e.g.*, the North Sea was found to contain about $3\frac{1}{4}$ per cent of salineness, the Kattegat and Sound about $1\frac{5}{8}$ per cent, and the Baltic Sea only about $\frac{1}{2}$ per cent. Indeed, so brackish is the water on the eastern side of the Baltic that, at the time of the Crimean war, the people of Finland, cut off from their usual sources of supply, actually came to the British battleships, at the risk of being taken prisoners, to ask for salt, because the Baltic Sea water was not salt enough to enable them to evaporate sufficient for their requirements.

The fisheries in the waters which surround Sweden are a very important and profitable national industry, especially the herring fishery all round her shores. In winter the Baltic, if not actually blocked, is crowded with floating masses of ice; the fisherman, however, need not waste his time hunting about for herring, for experience has taught him that they will not go into water of lower temperature than 38 degrees.

The climate of Sweden, from the large extent of the country, of course varies considerably, and even in the central and southern parts the lakes and rivers are frozen as late as April. Vegetation bursts forth so rapidly in the spring that the snow has scarcely disappeared before the flowers appear in all their loveliness.

During that early or glacial period to which I have already referred, both animal and vegetable life was of course impossible in Scandinavia, but the researches of the archæologist and geologist have shown that, following upon the melting of the ice, primitive man crossed the Sound from the Danish coast and appeared upon the south and west shores of Sweden.

A proof of this is found in the fact that the earliest known stone-heap graves, or cromlechs, have been found only in the south and west, and not one on the east side of the country. Near the graves were found Kjökkenmöddinger, as they are called, or heaps of kitchen refuse long buried, and in them were found rough and rudely-shaped stone weapons and implements, such as arrow and spear heads and axes. And here, again, is a proof that the Swedish aboriginal was essentially a hunter and lived in a state of great primitiveness.

This early or first period is known as the "Stone Age." It is important to notice that the geologist has proved that primitive man here in Sweden in the Stone Age, roughly supposed to be some three thousand years ago, was not surrounded by the strange and monstrous reptiles and mammals, such as the mammoth and so forth, which one is accustomed to associate with prehistoric times.

If such creatures ever existed in Sweden they had become extinct by that time. The animals of the Stone Age were entirely those of the present day, *e.g.*, the reindeer, horse, ox, sheep, &c.

As the ice receded, man gradually entered the interior of the country by following the rivers and the shores of the large lakes and made his way to the east coast by following the shores of the Baltic; and archæologists have been able to trace with his progress an improvement in his domestic surroundings—his stone implements were wrought with greater finish and were polished; the stone-heap grave, or cromlechs, which were sometimes large enough to contain twenty bodies, gave way to a stone coffin covered by a mound or tumulus.

There is no doubt that the Stone Age embraced a long period of time in Scandinavia, and it merged almost imperceptibly into the second prehistoric period, or "Bronze Age."

The knowledge of bronze working came to the people of the peninsula from the south and south-east. Cremation became the practice, and in the graves or mounds of the Bronze Age were found clay cinerary urns and bronze spears and swords—weapons quite unknown in the Stone Age. There was no such thing as a stone sword. In addition personal ornaments were found, and, in a word, a much more marked step is shown towards civilisation than was possible in the ruder Stone Age.

Nearly all the finds of the Bronze Age have been discovered in Southern Sweden, and very few in the north, which shows that the population was still centred in the south.

This brings us to the third prehistoric period, the "Iron Age," when the use of iron and the more ordinary metals became known, and civilisation advanced from the savage and nomadic stage to one of agricultural communities with fixed habitations, laws, and governments.

The Iron Age dates from about the beginning of the Christian Era. In the middle of the Iron Age, from about the year 450 to 700, the influence of Ancient Rome was felt, and there was considerable commercial intercourse between this peninsula and Rome.

In the latter Iron Age we hear of the Vikings, and Christianity was preached by Anskar (St. Ansgarius) and other German missionaries. The three prehistoric ages—the Stone Age, the Bronze Age, and the Iron Age—do not mark any sharply defined period of time, but are intended to indicate or classify the degrees of development from the aboriginal savage to the period when the recorded history of this part of the peninsula may be said to commence, *i.e.*, at the close of the Iron Age.

I have dwelt on these three prehistoric periods thus fully, because they will again come under our notice when we visit the Museum at Stockholm.

Here let me point out that the most southern province of Sweden still retains its ancient name *Scone*, or *Scandia*. You see then that *Scandinavia*, by which name the whole peninsula of Norway and Sweden is generally meant, was originally only the southern part of Sweden. The *Götar*, or *Goths*, are the first tribe of which we hear in Sweden, and their name still lives in the names of the two provinces south of the great lakes, *Eastern Gothland* and *Western Gothland*.

The next tribe was the *Svear*, who settled north of Stockholm in the country round *Upsala*, and this is the tribe mentioned by *Tacitus* as the *Suiones*, and subsequently by other writers as the *Suethans* or *Suithidi*. Here you see the derivation of the name *Sweden*.

The Anglo-Saxon poem, "*Beowolf*," dating from about the year 700, speaks of the different territories of the *Götar* and the *Svear*—the two being separated by dense forests. In the ninth century the two tribes became united, the *Svear* or *Swedes* being dominant.

I will not weary you with any historical details. Let me say, in brief, that Swedish history may be divided into four principal epochs:—

The first—the prehistoric period of Paganism, to which I have already somewhat fully referred, and to which I shall have again to call your attention, extending to the dawn of Christianity in the eleventh century.

The second epoch—the era of Christianity dating from the eleventh century to the accession of *Gustavus Wasa* in 1523. We shall see the tomb of this king at *Upsala*.

The third epoch—Sweden's glorious and Golden Age, under the *Wasa* dynasty—*Gustavus Adolphus* and his successors, until 1718, when her armies were defeated, and Sweden sank into a second-rate power.

The fourth epoch—from 1718 until the present time and now under the *Bernadotte* dynasty.

You will have heard of the famous *Göta*, or *Götha*, Canal, by which the North Sea is connected with the Baltic.

The idea of connecting the two seas is very old. It was mooted as far back as the early part of the 16th century, in the days of *Gustavus Wasa*, but it was not until the beginning of the present century that such a scheme was carried into effect. The *Göta Canal* is really a series of short canals which connect the large lakes together, forming one continuous waterway all the distance between *Gothenburg* and *Stockholm*, 370 English miles.

It is undoubtedly a colossal engineering work, the first part

planned and developed by Baron Swedenborg, and the remainder, the largest part, by Baron Baltzar von Platen, who, however, did not live to see the completion of the work, for he died in 1829, and his simple grave lies on the canal bank near Motala.

Von Platen was assisted by the English engineer, Thomas Telford, and the canal was opened in 1832, and all the works completed in 1844. The highest part of this waterway is in Lake Viken, a small lake between Lakes Wener and Wetter, 380ft. above the sea level.

The steamers and other vessels, therefore, on their passage from coast to coast, have to climb and descend a gigantic staircase of locks. The total number of locks is 74, and at one place we visit, Trollhätta, there are as many as 11 locks together. The total length of canals is about 50 miles; the remaining 300 miles are canalized river and lake. There are seven lengths of connecting canals, and these are collectively known as the Göta Canal, though each part has its local name—*e.g.*, the section between Lakes Wener and Wetter is the "Westgöta linie," and that between the Wetter and the Baltic is the "Östgöta linie."

The steamers each way take about $2\frac{1}{2}$ days on the journey. The canal brings down to the seaports vast quantities of timber, which is one of the most important trades of Sweden, as you will readily understand when I tell you that four-sevenths of the whole surface of the country is covered with forests, chiefly of pine and fir, and birch, which grows abundantly in the north.

We commence our ramble at Gothenburg, the largest seaport on the west coast of Sweden—the Liverpool of Sweden, and the second largest town in the country; then following the course of the steamer up the Göta river, by the old castle of Bohus, the centre or capital of the province of Bohuslän, to the great falls of Trollhätta, where are the eleven locks of which I have already spoken.

We then leave the canal route to visit the old and historic Church of Husaby, where the first Christian king of Sweden was baptized; then the fine 12th century Cathedral at Skara; then Warnem Kloster, where some of Sweden's earliest kings lie buried.

We then reach Lake Wattern, which is some 80 English miles long by 20 broad, and there visit the quaint island of Wisingsö; and then, on the eastern shores of Wetter, we visit the old castle of Wadstena, and the not far distant ruined abbey of Alvastra. The Convents of Wadstena and Alvastra were in their day very wealthy, and included in their possessions the long narrow island of Öland on the south-east coast. We then visit the Church of Wreta Kloster, the burial-place of the Swedish branch of the Douglas family. Thence we go to Linköping, the second largest cathedral in Sweden.

We then go northwards to the Mälar lake, perhaps from its rocky shores, and its numerous islands—there are 1,300 of them, great and small—the most picturesque of all the large Swedish lakes. In traversing its 75 miles of length we will stop at Gripsholm, an old royal castle of the 14th century.

We then go to Stockholm,* beautiful for situation, standing as it does on several islands, just where the Mälar lake mingles its waters with those of the Baltic; hence it has been called “the Venice of the North.” Stockholm is further north than the highest point of Scotland, being of about the same latitude as the Orkneys.

From Stockholm we go to the University of Upsala, the most northerly point we touch. It is about the same latitude as the Shetland Islands. In Upsala there is the largest cathedral in Sweden. Upsala, too, is very interesting, because here in bygone centuries existed the great temple for the worship of those pagan deities of Scandinavia—Odin, Thor, and Freya.

We then cross the Baltic to the island of Gothland, and visit the ancient town of Wisby, of the deepest interest to the historian and antiquary.

Six hundred years ago Wisby was the “Key of the Baltic,” the chief centre of commerce, great and wealthy. In 1237 Henry III. of England allowed its merchants to trade with England duty free; and in the 14th and 15th centuries Wisby was a principal factory or depôt of the Hanseatic League, and possessed upwards of 20 churches and convents. All this glory is now departed, and we find within the ancient walls which still engirdle the town, the ancient churches now a mass of picturesque, crumbling ruins. Now-a-days, Wisby is a favourite resort for sea-bathing for those Stockholmers who do not object to the ten hours’ voyage.

We then return to the mainland, arriving at Kalmar, and visit the two little villages of Hagby and Voxtorp to see their curious and ancient circular churches; and we finish our ramble in Southern Sweden at Lund, the other University city. If Upsala is the Oxford of Sweden, Lund is the Cambridge. Lund, too, possesses the most ancient cathedral in Sweden.

Let me point out to you on the map the manufacturing town of Norrköping—the Manchester of Sweden. Norrköping has improved modern machinery. I counted calico power-looms, both plains and three shafts, running 180 picks a minute, which is on a par with our Lancashire practice. The work hours are from six in the morning to seven at night, half an hour out for breakfast, and an hour for dinner. Such long hours make it difficult for Lancashire manufacturers to compete against them.

* The “Isle of Piles.”

You will have noticed that a great number of places have their names ending in "köping"; there are three on this map—Jonköping, Linköping, and Norrköping. "Köping" signifies hamlet or town. Norrköping then signifies "northern town."

I secured a photograph which shows the principal square of Gothenburg, named Gustav Adolf Torg, after Gustavus Adolphus, who founded the city in the year 1619. Gothenburg is therefore a comparatively modern place.

The Torg or Square is situated on the banks of the broad Hamn Canal.

Gothenburg, as its name implies, is built upon the estuary of the Göta river, on the Dutch plan, with intersecting canals; from this it has been called the Rotterdam of Sweden, but from the extent and importance of its shipping we may well call it the Swedish Liverpool.

Gothenburg is a city of upwards of 76,000 inhabitants.

The Radhus or Town Hall is a large building, and was erected in 1670 from the designs of Tessin. Behind it rises the tower of the German Church, Cristina-Kyrka. On the right is a bronze statue of Gustavus Adolphus, and behind it is the Börs, or Exchange.

The street takes us right down to the quay side. Ascending the Göta river for some ten miles we come to the village of Kongelf. A boy is carrying a string of the ryebread of the country; it is baked in round flat cakes with a hole in the middle, so that they can be piled on a stick, or slung on a string. This ryebread is very coarse, but the Swedes consume a good deal of it at every meal. They often flavour it with aniseed, which, in my opinion, is not an improvement.

The river here is divided into two channels by a rocky island, and the rock is covered with the extensive ruin of the old castle of Bohus.

The castle of Bohus dates back for nearly 1000 years and was once the largest castle in Sweden. In former days there was bitter feud between the Swedes and Norwegians, and when I tell you that this castle stood on the former boundary of Norway and Sweden, you will realise that it has been the scene of many a sanguinary struggle. It was built by Hakon Magnusson, a Norwegian king, and subsequently captured by the Swedes, and was long a "bone of contention" between the two countries. As late as 1678 the Norwegians nearly succeeded in regaining possession.

You may judge the importance of this castle of Bohus from the fact that it gave its name to the province Bohuslän, in which it stands.

The castles of the kings in olden times were always called "hus," a word of the same derivation as "house." The fortress formerly possessed two round towers, of which only one now remains.

The two towers received the names of Father's Hat and Mother's Cap, but whether the surviving tower is Father's Hat or Mother's Cap I am sorry I cannot tell you.

A few miles from Gothenburg there is a space of ground, covered by a number of upright gravestones, which are believed to mark the spot where a battle was fought in bye-gone times, probably with some predatory band.

I took a photograph of two of the largest of these gravestones, and the higher stone is believed to mark the burial-place of the chieftain or king. The grave-mounds of the Iron Age were often ornamented with large and upright gravestones; they are called "bautastenar." They are sometimes of considerable height, and not infrequently a Runic inscription is



Falls of Trollhätta.—E. W. M.

carved upon them. I shall have more to say about Runic inscriptions presently.

Continuing the ascent of the Göta river, 45 miles above Gothenburg, we arrive at the famous falls of Trollhätta. These are a series of cataracts and rapids extending for a distance of very nearly a mile. The falls are seven in number, and altogether 112ft. in height. The largest of these falls, the Toppö Fall, is 44ft. in height.

"These falls," says Mr. Charles Wood, F.R.G.S., "are not high and perpendicular, as are most of the celebrated falls of the world, but they are of tremendous extent and amazing rapidity, an immense mass of rushing, swirling, seething foam,

whilst the body of water is probably the largest of any fall in Europe."

The ironworks, sawmills, and factory chimneys on the margin of the river help by the sense of proportion to give you an idea of the immense area of rushing torrent here at Trollhätta. There is a slender footbridge from the ironworks to the Toppö Island. The charge for crossing is about 3d. in English money, and only one person is allowed to cross at a time. Many fatal accidents have occurred here—a fall into the water is certain death. A story is told of a man who was crossing the river in a boat, but it was carried into the rapids. As he reached the brink of the fall he stood up in the boat, waved his hat to the people on the bank, and the next moment he was dashed to pieces.



Locks on the Göta Canal at Trollhätta.—E. W. M.

The name Trollhätta means the hat or cap of the Troll or Witch, from the legend of a Troll, who, desiring to take a bath in the lake above, endeavoured to stop the leak of the lake with her cap. But this stream was too strong for her, and becoming enraged she left her cap and went somewhere else. Hence the name Trollhätta, the cap of the Troll.

The steamers and other craft cannot, of course, ascend these Trollhätta falls; they therefore ascend by one of those short lengths of canal built parallel to the river, leaving the river above the falls, and entering it again below the falls, and the vessels descend the height of the falls by a staircase of eleven locks.

Each of these locks is 24ft. wide and 10ft. deep. This was undoubtedly the heaviest engineering work of the Göta Canal.

This splendid trophy of engineering skill is beautifully situated, surrounded as it is on all sides by the luxuriant foliage of magnificent trees, and it is a very remarkable sight, as you walk along the high road, which lies between the rushing river and the canal, to catch glimpses through the trees of the funnel and masts of a steamer gliding smoothly along through the landscape on your right, while you hear the thunder of the falls away on your left. I suppose the Manchester Ship Canal also affords this sensation to some extent, but I fear that the Lancashire surroundings are scarcely so picturesque as in the case of the Swedish Canal. Fairly large steamers, laden with timber, use the canal on their way from Lake Wener to Gothenburg.

There is a charming walk under the trees which takes us over a footbridge to a point in the river below the great Falls, where you are able to see the broad expanse of water just before it settles itself down again into the quiet placid river.

There is a stream which is simply the by-wash on its way down to the river from the water-wheel of a locomotive engine works, situated on the higher ground on the right, and near the canal. It, however, adds greatly to the charm of the walk.

We now turn aside from the canal route to visit one of the most historical and oldest churches in Sweden, that of Husaby in the province of Västergötland.

You know that the kings' castles were anciently called hus (house), hence the name Husaby, from the ancient stronghold or house of the king—kungshus—which formerly existed here. Out of the old kungshus rose the church of Husaby, and the triple tower is part of the original castle, which was entered through the side towers.

Here was born, about the year 965, the first Christian king of Sweden, Olaf Skötkonung, which means Olaf the Lap-king, so called because he was elected king while still an infant in his mother's lap. Olaf was baptised about the year 1001, here at Husaby, by St. Sigfrid, who was sent by Ethelred, king of Saxon England.

Olaf Skötkonung died in the year 1024, and his tombstone lies before the church door. Olaf's queen, Astrid, also lies here.

From these dates you will perceive the antiquity of the building—upwards of 900 years old.

We now enter the interior of this ancient church. Olaf Skötkonung eventually gave his castle here at Husaby as a residence to the first Bishop of Västergötland. Thus you see the origin of this church of Husaby, which was used by succeeding bishops as their cathedral for nearly 140 years. The church, with the chancel included, only measures 105ft. long and 32ft. wide.

The religion in Sweden is now the Lutheran, but in this church are the ancient carved screen and bishop's chair, and beyond the altar of Roman Catholic times. There is a curious old chair, which usually stands by the altar, and I had to lift it into a prominent position in order that I might photograph it. In Catholic times, the ceiling was painted with frescoes, which were whitewashed over. On the pulpit, in addition to the stands for candles, is a bracket with a crucifix on the right, and a bracket with a sand hour-glass, for the preacher's benefit, on the left. I also saw in this church some curious old black-letter books of great age.

We now move on to the not far distant town of Skara, where stands next to Husaby, and Lund further south, the oldest cathedral in Sweden.

This cathedral of Skara was consecrated by Bishop Ödgrim in 1151. It is therefore about 750 years old. After it was built the see of the bishops of Vestergötland was removed to Skara here from Husaby. This cathedral formerly had several towers, of which only two towers are left.

Skara is to-day a town of 3,000 inhabitants, and it is of great interest to note that it was, before the advent of Christianity, the centre of heathendom of Gothland, the land of the first tribe we hear of who settled in the south of Sweden.

This cathedral is reared upon the site of the former heathen temple, where the heathen sacrifices were offered. The cathedral, notwithstanding repeated ravages by fire, will bear comparison with the cathedrals of Upsala and Lund, which we shall visit. Before leaving Skara Cathedral, we pause a moment before the finest monument which is contained there. It stands on the south side of the altar, and is in memory of General Erik Soop, who saved the life of the King Gustavus Adolphus at the battle of Stuhm, in West Prussia, in 1629.

The body of the general lies in the tomb in front of the monument. The recumbent effigy of Soop is in white marble, and behind him is a bas-relief carving representing the battle scene in which Soop is saving the king's life.

About nine or ten miles east of Skara is the Church of Warnem, built about the same period.

The Church of Warnem is one of the largest and handsomest of the Swedish country churches. It is very picturesquely situated, nestling, as it were, among beautiful trees in its own garden. Warnem was formerly a Bernardine convent. The church is in shape a Gothic Cross, with a lofty tower over the transept, and two smaller towers at the west end. The towers are roofed with wooden slabs. Round the east end are ranged a number of chapels, each containing the tomb of an early Swedish king, among them the famous Birger Jarl, the reputed founder of Stockholm, who died in 1266.

The church was burnt by the Danes in 1566, but was rebuilt in 1668.

The organist at my request was good enough to play the organ for me. It is a large and sweet-toned instrument. It was built in Denmark, and the organist considered it the best in Sweden—an opinion, of course, open to doubt.

I took a photograph on our three miles drive from War-nem Church to the railway station at Axavalla, which gives a glimpse of Swedish way-side pastoral life. In a field adjoining the road these men were loading the bullock-waggon with hay-grass.

We now embark on a steamboat at the southern end of Lake Wetter, the second largest of the great Swedish lakes, and by many people considered the most beautiful. After about two hours' voyaging, we approach the island of Wisingsö, and the first object we notice before we land is a ruin. It is part of the castle of the princely Counts of Brahe, who were exceedingly powerful in the 16th and 17th centuries.

Tycho Brahe, the astronomer, was a scion of this family; his home, however, was upon the west coast.

Several of the older kings of Sweden, as far back as the 13th century, resided on this island of Wisingsö. As you will have guessed, I obtained an instantaneous photograph on board the moving steamer.

Manners and customs are still very primitive on this island of Wisingsö. A carriage which met our steamboat seemed nothing more than a board carried upon wheels, with a bed, mattress, or blanket for a cushion.

We had a good idea of the national costume by examining the dress of a girl, the skirt generally a dark blue woollen, the waist dark, a bright scarlet or blue apron, brilliant with transverse bands of white, green, or yellow, and, with a correct costume, a tall, conical, graceful cap, black with red trimmings, and two balls falling on the back.

As I said, customs here are primitive, and the idea of a girl of one parish being married to a man of another is regarded with disfavour, and as if it implied some slur upon the young fellows of her own parish. Du Chaillu relates the following anecdote, which illustrates the primitive love-making in these out-of-the-way country villages:—

One evening, at a farm, he heard a gentle knocking at the door, and a voice which he recognised as that of one of the many suitors to the hand of the fair daughter of the house. The young man said: "Sigrid, will you not open the door for me?" No sound was heard from within; more gentle knockings and supplications; the maiden still remained silent. "Sigrid," continued the lover, "you are such a nice girl. You know that if I did not admire you I would not come so far to see you! Can

you be so hard-hearted as to send me away? There are no girls in the parish I admire so much as yourself. Please, please, open the door; the wind is chilly; I am very tired; I come only to talk a little with you, and then I will go away." Sigrid at last relented, and the young man was admitted.

A long shady avenue brought us to the Church of Wisingsö. It was completed in 1636 and possesses a fine portal. Under the church are the burial vaults of the Brahe family. We could see from the lake a little bit of their ruined castle.

It is with rather a feeling of surprise that we find so important looking a church on this island of Wisingsö, out in the middle of Lake Wetter.

The bell-tower—I may call it a campanile-tower—is a remarkable and elegant structure. It stands quite away from the church—in fact in the graveyard, on the other side of the high road. It is constructed entirely of wood. A chamber for the bells is carried upon great inclined beams of timber, and you can pass through underneath the bell-chamber; the wind, too, can blow through and all round the structure, which at a distance rather suggests the notion of a huge pigeon-cote. Bell-towers of this description—they are called "klock-stapel"—are a usual feature of the Swedish country churches.

The island, Wisingsö, was rich in discoveries of the Iron Age. There is an extensive oak plantation on the island, the timber of which is used in the Government dockyards.

Now we embarked again on the steamer, and made our way along Lake Wetter to Wadstena, an ancient town on its north-eastern shores. The name of the steamer was "Wisingsö," called after the island we had just left. I had a good night's rest on board of her, and you will realise that it is possible to do this when I remind you that the lake is 84 miles long—*i.e.*, about as far as from Manchester to Birmingham. The accommodation is good, and I had a comfortable cabin to myself; the cooking also is good. A tall pipe is the chimney of the cook's galley. The waiting is done by 'stewardesses. The boat is on her way to Stockholm, calling at this little harbour of Wadstena for passengers and cargo. As she moors opposite the old castle of Wadstena, we got a view of the castle. Wadstena Slott (or Castle) has been described as one of the most beautiful Renaissance buildings in Sweden. It was built in 1545 by Gustavus Wasa. His son, Duke Magnus, spent many years here in a state of insanity, and one day, believing that he was called by the siren song of a water nymph, threw himself from a window of the second floor into the moat; his life, however, was saved by a faithful retainer. In recent years the interior has been used as a school, a manufactory, and a storehouse.

The not far distant town of Skeninge was at one time capital of Gothland, and its laws were very oppressive. That this was the fact, and that this slott, or castle, of Wadstena was at some period used as a prison is shown by a litany of the peasants, in which occurred this special petition—

Från Skenninge rätt och Wadstena Slott
Bevara os milde Herre Gud !”

i.e., “From the law of Skeninge and Wadstena Slott (or Castle) good Lord deliver us !”



South Aisle, Alvastra Kloster.—E. W. M.

About 17 miles south of Wadstena, and near the eastern shores of Wetter, are the convent ruins of Alvastra. The convent was built in the middle of the 12th century by Queen Alfhild, from whose name the name of this convent Alvastra is derived. She was the wife of King Sverker I. Alvastra is built of limestone, and the whole building was roofed with barrel-vaulting, such as is now seen at the west end of the nave.

This ruined church of Alvastra is by some people considered the finest in Sweden, and this is perhaps the case, if we except the ruins of Wisby out in the Baltic. Alvastra is a most picturesque ruin. At all events this convent, in addition to being one of the oldest, was also one of the most renowned in Sweden. It was originally in the possession of Bernardine monks, but

was finally given up to nuns. . After the Reformation, part of the stone of this convent was, in the 16th century, used in the construction of the castles of Wadstena and of Wisingsö.

At Linköping—a city of upwards of 8,000 inhabitants—there is the second largest cathedral in Sweden. The nave is 97ft. wide and 55ft. high. Its length of 329ft. represents the growth of several different periods. The oldest part of the church is from the east end to about the pulpit, and it is said to date from 813. The central portion, including a round pillar—there is only one round pillar—as far as the hexagonal pillar carrying a notice-board, was built about the year 1300, some 500 years later than the east end.

The arches running along the wall are round until nearly the west end, where they are pointed. From the hexagonal pillar to the pointed arches the building is 15th century, and from the pointed arches to the west end 18th century. There are here, therefore, four different periods of building.

This cathedral possesses a beautiful and striking altar piece. A group forming part of the altar-piece of the high altar represents Faith and Hope, and is the work of Byström, the same sculptor who executed the statue of Gustavus Adolphus, at the Stockholm Palace. We can read the word “*Evangelium*” in the open page in the hand of Faith. The faces have a beautiful expression.

I attended the Sunday afternoon service in this cathedral on the 17th of last June. It was impressive, although I could not understand the Swedish language.

We thence proceeded north-east for Stockholm, traversing a considerable portion of the Mälar lake, and in so doing we visited Gripsholm, a fortress of mediæval times, which stands upon that lake.

Gripsholm is a name which signifies the “Island of Grip.” Grip means “griffin” or “vulture,” which was the crest worn upon his helmet by the famous Bo Jonsson, surnamed from his crest, Grip, the powerful minister, or rather co-regent, of King Albert, in the latter part of the 14th century.

It was Bo Jonsson Grip who built the castle of Gripsholm in 1316. It was rebuilt by Gustavus Wasa 200 years later, and he and his successors largely resided here.

Eric XIV., the eldest son of Gustavus Wasa, deposed by his brother, John III., was imprisoned in one of the towers at Gripsholm, and he saw no more of the world than such glimpses as he could obtain over the Mälar lake, through narrow openings in the tower. Eric in his captivity became insane, and his incessant wanderings round and round the tower have worn a deep track in the floor.

There are two large cannons, which are of beautiful workmanship, and were captured from the Russians at Ivangorod, by the

Count Jacob de la Gardie, in 1581. They are the kind of ordnance which was in use in the days of our Queen Elizabeth.

One of the chief interests to-day of the castle of Gripsholm is, that it contains a large collection, about 1,800 valuable historical portraits, not only Swedish kings and nobles from the time of Gustavus Wasa, but also crowned heads of other nations, among them Queen Elizabeth, Mary Queen of Scots, and Queen Marie Antoinette.

We now reached Stockholm, at the eastern extremity of the Mälar lake, just where that lake by rapid streams mingles its waters with those of the Baltic. My first sight of Stockholm was the Quay, where all the lake and canal steamers land their passengers. The large building on the right is a Law Court.

The oldest part of Stockholm is the Riddarholm—the Knight's Island—where Birger Jarl founded his city. Stockholm is built upon eight islands at the outflow of the Mälar. As some of you may know, in order to prevent enemies' ships from sailing into the lake, Birger Jarl caused piles to be driven into the stream; hence the origin of the name, "Stock," timber or pile, and "holm," island. Stockholm is a city of some 200,000 inhabitants. From the "Catarina Hissen," a lofty elevator 92ft. high, on the south side of the city, you have a good general view of Stockholm. Stockholm has a good harbour, both on the Mälar side and on the Baltic side. A part of the harbour on the river side is used by smaller vessels.

Beyond is the Corn Market Place, and on the left is the Bank, where I got some of my English notes changed into Swedish money. A short distance beyond the Corn Market Place you see the spire of the German Church; a little further on the Tower of St. Nicholas, more commonly known as the Storkyrkan, or high, or Court Church. The large block of buildings which is seen in the distance, a little on the right, is the Royal Palace, which we visited.

On the left is the Riddarholm Church. This church, with its iron spire over 300ft. high, and whose chimes are only heard at the death or funeral of a king, is undoubtedly the most interesting of the numerous Stockholm churches, from the fact that it is the Royal Mausoleum.

The whole floor is paved with the gravestones of famous men, and all round the church are chapels wherein lie departed royal heroes of Sweden.

In the side chapel on the left, in the words of a writer, "repose the mortal remains of the chivalrous and heroic champion of the Protestant cause, the great Gustavus Adolphus. He died sword in hand and covered with wounds upon the field of Lützen, 16th November, 1632." Surrounding the outside of

the Gustavus Chapel are marble slabs with Latin inscriptions referring to the hero. They run thus:—

In Augustus intravit,
Pietatem amavit,
Hostes prostravit,
Regnum dilatavit,
Suecos exaltavit,
Oppressos liberavit,
Moriens triumphavit.

He braved dangers,
Loved piety,
Overcame his enemies,
Enlarged his dominions,
Exalted his nation,
Liberated the oppressed,
Triumphed in death.

The side chapel with the domed roof, on the right, is the Carolin Chapel, in which is the tomb of the fiery Charles XII. In this chapel are also buried Charles X. and his Queen Hedvig Eleonora.

Here is a couplet which has been translated from the Swedish, thus—

“Tower, heroes’ statues, palace, muses’ fane,
Stand nobly mirrored in the stream beneath;
While bathed in evening red, glows Riddarholm,
Where, beneath marble, Sweden’s glory sleeps.”

The bronze statue is one of Gustavus Wasa, the founder of the dynasty and great-great-grandfather to Gustavus Adolphus. The statue was erected by the nobles in 1773.

A few minutes’ walk brings us to the Storkyrkan or Court Church.

This church was founded by Birger Jarl in 1264, but was entirely rebuilt 150 years ago.

The chief ornament of the church is the beautiful and elaborately-carved altar piece in ebony, silver, and ivory. The carving represents the birth, passion, and resurrection of Jesus Christ.

In this church the coronation of the sovereigns of Sweden takes place.

Some thirty years ago, Louisa, queen of Charles XV., gave a sum of money to provide annually a dower of kr. 150, equal to about eight guineas, a new bible, and a complete fit-out of wedding clothes on their wedding day to five poor girls who bore good characters, and who were recommended by their parish priest for this benefaction.

This interesting ceremony takes place in this church every 19th of June.

I was in this church on the afternoon of the 19th of last June, and witnessed the wedding of five girls who had received this royal gift. The girls wore black dresses, and white tulle veils, fastened on with the flower of the syringa, or wild orange.

The Royal Palace almost adjoins the Storkyrkan, and is in the heart of Stockholm.

In the distance, on the right, is seen the spire of the Riddarholm Church. Under the bridge, on the right, you see the

water coming from the Mälar lake. The water is scarcely so much a river as an arm or fjord of the Baltic.

Surrounded as it is by islands and streams, on almost every side, Stockholm has been well called the "Venice of the North." Some enthusiasts, indeed, go so far as to aver that the north-east front of the Palace, with its sloping approaches on the north and south sides, strongly recalls the Doge's Palace, and the Piazza di San Marco at Venice. The Royal Palace stands on the site of an earlier edifice. It was built from the designs of the Swedish architect, Nicodemus Tessin, and completed in the year 1753. The general style of architecture is simple and



Royal Palace—Stockholm.—E. W. M.

massive; it forms a large quadrangle 136 yards long and 127 yards wide.

The quadrangle is entered by four vaulted gateways, one in the centre of each façade.

The one on the north side is called "Lejonbacken," from the two colossal bronze lions; which are placed at the top of the inclined planes, leading up right and left from the quay.

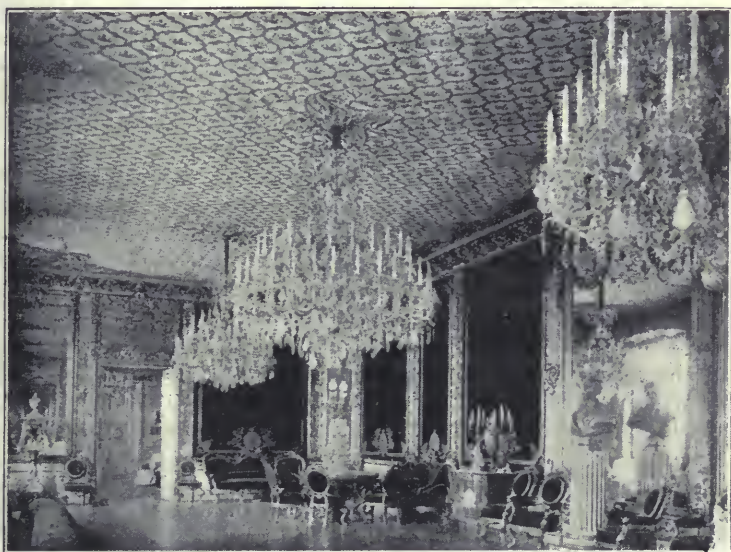
By the kind permission of the Grand Chamberlain I was allowed to photograph one or two interiors, first a very interesting room known as the Chamber of the "Conseil d'Etat"—the chamber in which the Cabinet Council sits, where at the end of the table is the king's chair.

There is a large equestrian portrait of Bernadotte, a general

of Napoleon Buonaparte, and who became King Charles XIV. of Sweden and Norway.

On the left is the bust of Charles XV., grandson of Bernadotte; and in the window on the right is the bust of Prince Oscar Bernadotte, a commander in the Swedish and Norwegian navy. By birth Prince Oscar is heir apparent, but he has forfeited this position because he married a lady of noble birth, but not of royal blood, named Ebba Munch. This room is panelled with tapestry illustrating the mythological story of Jason and Medea, and which is entirely Swedish and Norwegian work.

Secondly, I was allowed to photograph one of the State apartments known as the Victoria Salon, which is a magnificent



Victoria Salon, Royal Palace, Stockholm.—E. W. M.

room. The decorations are in crimson, purple, and gold, and the walls are hung with crimson purple velvet embroidered with gold. The ceiling is white stucco, covered all over with gilt crowns.

The large mirror was a present from Napoleon III. to Charles XV., grandson of Bernadotte, and brother to the present king.

Through the open door you see the Audience Chamber where the king is interviewed by State visitors; and this large Victoria Salon is the room in which they and their attendants generally wait until it is their turn to be admitted to the royal presence.

On emerging from the south entrance to the Palace we took a view showing a statue—it is the work of the Swedish

sculptor Sergel—of the king, Gustavus III., who was a contemporary of our George III.

From this quay most of the larger ocean-going steamers take their departure. But the object which most attracts our attention here is a handsome building across the water. It is the National Museum, and is one of the finest buildings in Stockholm. It is in the Renaissance style, with a portal of Swedish marble. It was commenced in 1850, and completed 15 years later.

In this Palace are some beautiful sculptures, two of them, by Thorwaldsen, were very fine; they are the Statue of Victory, which stands in the long gallery leading to the state ball-room, known as the "white sea," in the Royal Palace at Stockholm; the other is The Dancing Girl, which stands in the same long gallery of the Royal Palace. A statue of the great Gustavus Adolphus, the great military hero of Sweden, and champion of the Protestant cause, who lies buried at the Riddarholm Church at Stockholm, by the sculptor Byström, is in the Royal Palace.

The Museum has a splendid collection of pictures, and a fine numismatic and ceramic collection, but to me the chief interest of the Museum is centred in those relics of prehistoric man, of which there have been so many rich discoveries in Sweden.

Let us go and see some of them! But how to get across the water?

We crossed in one of the numerous steam gondolas, or launches, which flit about hither and thither in all directions, and which seem to perform the omnibus service of the city, and which help to complete the analogy between Stockholm and Venice.

The passengers who come across from the quay by the Palace, land at the stairs just in front of the Museum. The fare they pay is somewhere about a halfpenny. Very handy are these little boats! There are perhaps some fifty of them engaged in this to-and-fro traffic. According to Mr. Chas. Wood, at night "the water is a scene of flashing lamps—green, red, and white. Too dark to see the steamers, you trace their courses by these lights—courses so silent that the gleams seem to possess an independent existence. Gigantic fireflies, will-o'-the-wisps flitting over the winding surface of the water—a land of enchantment, beautiful and interesting. This alone is worth a visit to Stockholm, and would tempt you some day to repeat it."

We soon found ourselves in the entrance vestibule of the Museum at Stockholm, and the first objects which claimed our attention were three colossal statues of the national pagan deities, Odin, Thor, and Freya, by Vogelburg.

The statue on the right is Odin, whom tradition has endowed

with every miraculous power. Odin was called the "Father of victory," for when he laid his hand upon the heads of his guards success never failed them. As he always spoke in verse he was called the "artificer of song." At his word fires would cease to burn, and the wind and the sea to rage. If he hurled his spear between two armies it secured victory to those on whose side it fell. It was believed that all who died in battle were his adopted children, and that the Valkyrie would conduct their spirits to the Valhalla, where they would have perpetual life and feasting in the halls of Odin. To join Odin was the height of a warrior's ambition, and to this day it is a curious fact that the common people, when roused, ejaculate "Go to Odin!" whereas our English people, under similar circumstances, would consign their friends to a warm place, which shall be nameless.

Wednesday, or "Wodensdag," was the day specially set apart for the worship of Odin.

In the French, which is derived from the Latin, we have a remarkable analogy; Wednesday is Mercredi, day of Mercury.

The statue on the left is Thor, the most valiant of the sons of Odin. Hare writes—"As the defender and avenger of the gods, Thor carried a hammer with which he destroyed the giants and which always returned to his hand when he threw it." Thor had a girdle which, when he wore it, redoubled his strength. The day on which his worship was celebrated was "Thorsdag"—Thursday. The Roman god Jupiter, the god of thunder, had the same attributes as Thor. Here, again, is the analogy in the French—Thursday is Jeudi, the day of Jove or Jupiter.

Above is the statue of Freya; Freya, though considered the goddess of increase and of love, was regarded as a hermaphrodite. She was believed to drive about in a car drawn by wild cats. She knew beforehand all that would happen, and divided the souls of the dead with Odin. The sixth day of the week was set apart for her worship—Freya's dag, or Friday.

Again, in the French, Friday is Vendredi, the day of Venus. This remarkable analogy goes to prove that the heathen deities of both Northern and Southern Europe would appear to be derived from a similar source, and that they are endowed with similar attributes.

We now passed on to examine some of those finds of prehistoric times which have been so abundant in Sweden.

Primitive man, as we have already seen, made his appearance on the south-west coast of Sweden. In the earliest cromlechs implements of stone only have been found; hence it is called the Stone Age, and it is believed to date from about 3,000 years ago.

This is an arrow head of flint, roughly chipped to shape; the next is a flint tool, possibly used as a wedge for splitting

wood, and so forth, also roughly chipped. Then you have above a saw, and below it an axe-head, both of roughly chipped flint. Here on the right you have a flint axe-head from the later Stone Age, and you notice the difference from the others. It is a much more finished article, being smoothly wrought, one might almost say polished, and you notice that it retains the mark of the handle or haft.

The Stone Age merges imperceptibly into the next pre-historic period, the age of bronze working, which was introduced from the south-east.

Most of the vessels found in the graves of the Bronze Age are of this shape, and generally have a smaller cover, such as the one here exhibited. With improved circumstances there is a marked advance towards refinement, and with it grew a taste for personal adornment; and here also is a bronze diadem, a spiral bracelet and a small bracelet, both of bronze. These were all three found in Scane, in the south of Sweden.

There is a bronze comb, and when we consider the age of these articles, some 2,000 years, we cannot fail to admire the beauty of their workmanship.

The Iron Age dates from about the Christian era. There is a drawing in Du Chaillu's work which shows you pretty well the appearance of a Viking chief some 1,500 years ago. In reference to this chief's costume Du Chaillu says: "The representation is not an imaginary one. The clothing, arms, and ornaments are exact drawings of those found in the peat bogs of South Jutland: the peat has preserved them in the most astonishing manner. The clothes are wool of finer texture than in the Bronze Age. The feet are shod with leathern sandals."

There is the bow and arrow, and the heavy sword, of which they were so proud.

A beautiful gold necklace of the same period as the Viking chief was found in the island of Öland, on the south-east coast of Sweden, and is now in the Museum. It consists of five tubes placed one above the other, and covered with the most exquisite filigree.

There are bronze plates found in the same island, and they show the arms and the curious forms of helmets used by the Vikings about 1,000 years ago. Perhaps the most remarkable sign of progress in the Iron Age was the introduction of a peculiar form of writing, known as Runic. Here are shown the earliest known Runes, which consisted of 24 characters, and below them the later Runes, which were 16 in number.

The word "Rune" means mystery, and we can well imagine that the writings must have been very mysterious to those ignorant barbarians of 1,500 years ago, for barbarians they still were, notwithstanding advancing civilization.

The writings were usually cut in stone, and these stones are therefore called Runic stones. The Runic inscriptions were difficult to decipher, because they followed no fixed rule. The inscriptions usually ran from left to right, but occasionally they were from right to left; in some the order of the letters alternates in each line; some must even be read in vertical lines.

The country road at Täby, north of Stockholm, leads over an old bridge. At the north end of the bridge is a stone, with the Runic inscription arranged somewhat in the form of a scroll. It has been translated thus: "Jarlabanke had these stones raised for himself while he was yet alive. He built this bridge for his soul's welfare, and he was the owner of the whole of Täby. God save his soul."

There is another very interesting Runic stone. It is about 5ft. high, and was found in the island of Gothland, but is now in this Museum, where I examined it closely. The inscription is round the edge; at the foot is a ship with one mast and one sail. It is similar to the vessels in which the early Vikings put to sea. It has the high prow and stern. Above is the eight-footed horse of Odin, named Sleipner, and before it are persons making offerings.

The country people in some districts still leave a bundle of hay for Odin's horses.

A natural transition from Odin's horse is to what Hare has described as "the graves of the gods."

There are at Upsala, forty-four miles due north of Stockholm, three large mounds or tumuli, and they are of great interest to the antiquarian.

These mounds, which have undoubtedly been raised by the hand of man, are about 60ft. high and about 230ft. diameter at the base. The mound on the left is the grave of Freya, the centre mound that of Thor, and that on the right the mound of Odin. This is indeed a remarkable spot. The mound of Odin was opened in the year 1847, and deeply imbedded in the sand and gravel was found an urn 7in. high and 9in. in diameter, containing calcined bones and objects now in the Museum at Stockholm. I myself examined these relics. We must, of course, reject the tradition that these mounds are the graves of supernatural beings, but there is no doubt that they were used for human interment; and this we can better understand when we remember that here was situated, in heathen times, the great central temple of Sweden for the worship of those pagan deities Odin, Thor, and Freya.

Three great festivals were annually held here, when multitudes came to worship and sacrifice. The first was the festival of "mother-night," to invoke the blessings of a fruitful year; the second was in honour of the earth; the third was in honour of Odin, to propitiate the "Father of Battles."

Every ninth year the king and the chief persons of distinction were expected to appear before the great temple here, and nine victims were chosen for human sacrifice. In time of war they were captives, but in time of peace slaves, the last words of consolation spoken to each victim as he fell being "I send thee to Odin."

How thankful we should be that the times of such superstitious ignorance have passed away.

On the map you will find the modern city of Upsala, the university city which I described to you as the Oxford of Sweden. I may also describe it as the Canterbury of Sweden, for Upsala is the see of an archbishop and possesses the largest cathedral in the country. The cathedral stands upon high ground, and is very well seen. It is a handsome and interesting pile, and its Gothic architecture rather suggests the style of some of the French cathedrals—indeed, the architect was a Frenchman, Etienne Bonneuil by name.

It was commenced in 1260, but was not finished until nearly 200 years afterwards. It has been restored, and is of red brick with stone portals. The towers rise to a height of 400ft. and are a landmark for miles around. The length of the church is 370ft., and the height is 90ft. inside, rising another 23ft. outside. Wandering through the lofty and elegant nave we enter into the Gustavian chapel, which is at the east end, beyond the high altar. The chief pride of the Upsala Cathedral, and probably its object of greatest interest is the tomb which is found there.

Here lies buried the great Gustavus Wasa, the founder of his dynasty, and with whose reign commenced Sweden's golden age, her era of glory. Gustavus Wasa, to whom I have already referred as the builder of Wadstena Castle on the shores of Lake Wetter, again as the re-builder of Gripsholm, and again as the great-great-grandfather of Gustavus Adolphus, Sweden's great military hero, and whose body lies, you remember, at the Riddarholm Church at Stockholm. Gustavus Wasa was married three times, and on this tomb his effigy lies between those of his first two queens, who are also buried here. His third queen, who survived him, is also buried in this cathedral separately. Gustavus Wasa died in 1560. The tomb, which was made in Flanders, is flanked with obelisks, and decorated with coats of arms. This tomb was erected, or rather ordered to be erected, for I do not think he lived to see its completion, by Gustavus Wasa's second son, John III., whose tomb is also in this cathedral of Upsala.

John III. was that king, you may remember, who deposed and imprisoned at Gripsholm his elder brother, Eric XIV., who became insane. This tomb of John, which is a curious medley of styles, has a strange history. After the death of John III., in 1592, this marble monument was executed in Italy by the

Tuscan, Donatelli; but on the voyage from Leghorn to Sweden it was shipwrecked. The monument was fished up again and taken to Dantzic, where it remained until 1785. Then, nearly 200 years after the death of John, the monument was set up here at Upsala by Gustavus III. Above are the words "Deus Protector Noster," and below "Johannes III. Rex. Sueciæ." On the left is a cherub holding John's helmet, and on the right another holding his gauntlet.

In this cathedral, under a plain stone slab in the floor, lies the body of the great naturalist, Linnæus.

Close by the cathedral stands the Upsala University. A university was founded here as far back as 1477, and richly endowed by Gustavus Adolphus. The old building became too small, and in 1886 a new building was opened. Upsala is attended by about 1,800 students. The late King Oscar was educated here.

Upsala is fortunate in the possession of a magnificent library, comprising at least 200,000 volumes, and 7,000 or 8,000 MSS. I saw there a MS. the ink brown with age, bearing the signatures of Martin Luther and Melancthon. The famous "Codex Argentæus" is also there. This is a copy of the four gospels, with silver letters of the Runic character on purple vellum. It is very ancient, and dates from the 4th century. It is of immense value, as it is believed to be the oldest monument of the Teutonic language.

We now embarked on board one of the steamers at Stockholm, sailing right out into the middle of the Baltic, on our way to the island of Gothland.

The steamers which carry most of the Stockholm suburban and canal traffic are very comfortable boats. They are all screw boats. I never saw a Swedish paddle-steamer whilst I was in Sweden.

The Mælar lake and the waters round Stockholm are frozen from three to five months in the winter season. Skating and sledging are then the means of transport. In fine warm weather these boats are very enjoyable, but even then there is sometimes a very chilly wind, which is not inaptly described by an alliterative couplet in Mr. Wood's book, thus—

"Beaux, Belles, and Bædekers, baffled by briny breezes,
Sat shivering o'er Swedish streams suppressing sneezes."

Mr. Wood, in his book, asks if the island of Gothland is not in its way the most wonderful of all islands? He answers his question by saying that if Gothland were a little more accessible, if its shores were washed by the English Channel instead of by the Baltic, it would be thought one of the wonders of the world; and he further remarks that few seem to know anything about it. They may have heard of such a place, and believe that the

title of the King of Sweden's second son is Duke of Gothland, and there it ends. Another authority, Du Chaillu, tells us that Gothland was particularly rich in discoveries of the Iron Age, but not of the Stone and Bronze Ages, this island being too far east; also that the inhabitants of this island were principally Vikings.

The history of the island is inseparably bound up in that of its chief town, Wisby. In the 10th, 11th, and 12th centuries the usual trading route from India and the East, through Egypt or Constantinople, was interrupted by the crusades. Commerce then made itself a way across Russia from the East, and, as the great emporium for the distribution of its goods to Europe, fixed upon the town of Wisby in the island of Gothland, which from its insular position in the middle of the Baltic was considered secure. Traders came to Wisby from England, Holland, Russia, France, the Mediterranean, and other parts of Europe—indeed, merchants from all parts of the world were admitted within the walls of Wisby. This is proved by the coins which have been found in great numbers when digging or ploughing, *e.g.*, Kufic coins from Asiatic cities, Arabic, German, and English coins of the 9th and 10th centuries. Wisby became a centre or factory of the Hanseatic League—a League which even held property in London in the middle ages.

With the continuance of the Eastern war the trade of Wisby increased, and the wealth of her merchants became fabulous. Each nationality or guild of merchants built for itself a church and sometimes a convent, some twenty of them all more or less handsome.

So rich a city naturally aroused the cupidity of neighbouring monarchs, and Wisby successfully resisted several sieges until, in 1361, Waldemar III. of Denmark took the city by storm, and carried away enormous plunder. Wisby never recovered this blow, for the Eastern trade was monopolised by the Italian republics, and the Cape of Good Hope opened out another and more direct sea route for commerce. Wisby has dwindled from the wealthy city of 600 or 700 years ago, of 20,000 or 30,000 inhabitants, to the little sea-bathing and fishing town of to-day of some 6,000 inhabitants.

We took a photograph of the ancient fortifications and walls, the "Ringmuren" of 600 years ago, on the north-east side of Wisby. They go right round the town, and enclose 170 acres. The walls are in ruins, and they shut in all those old churches of the 12th and 13th centuries which I have mentioned. In the distance you can see the waters of the Baltic.

These walls extend for $2\frac{1}{2}$ miles round the town, and have watch towers at regular intervals all the way along. The tower, next the sea, is called the "Jungfru-torn"—"the maiden's tower," in which a treacherous maid of Wisby, who was about

to open the gate to Waldemar of Denmark, was built in as a punishment. There is a second inner arched wall being, as it were, built against the outer wall, which is seen on the inside.

The walls now standing were built in the year 1288. They had 48 high watch towers, of which 36 or 38 are still in good preservation. They were built by the inhabitants of the island, each "tung" or parish erecting one. The towers are from 60 to 70ft. high. We looked at one of the towers on the north-east wall. It has narrow slits, or loop-holes, from whence arrows could be shot, or boiling oil, hot water, or molten lead could be poured upon the heads of a besieging enemy. Traces of the old moat are still discernible, especially on the north side.



Ancient City Wall, Wisby, from the East.—E. W. M.

Through an open doorway you may see the ruin of the Church of St. Göran, or George. This is the only Wisby church outside the walls, and it is supposed to have communicated by means of a subterranean passage with the Church of St. Nikolaus, which we visited within the walls.

One of the best streets in Wisby is paved with round cobble stones, and leads to the north gate in the wall. Wisby is quite an old-world place, and has the old-fashioned lamp-posts, upon which oil lamps are raised by cords. The largest of the ancient ruined churches of Wisby is the fine ruin of the Church of St. Nikolaus, built about the year 1240. It belonged to the Dominicans. Ten lofty square pillars remain standing. Although upwards of 600 years old, the tracery of the rose window is very

perfect. The width of the church is 65ft., and the length 199ft. The style of architecture is partly Romanesque and partly Gothic. There is a heap of soil on the left, which was thrown up in the endeavour to find the subterranean passage, to which I alluded just now, and which was believed to have formerly existed between this church and St. George's church outside the walls. In the trench I saw some human bones which the spade had laid bare, and which were pronounced to be those of a woman.

Wherever we turn in this strange old town we meet some old ruin, mementos of departed greatness—generally a church, mixed up indiscriminately with modern dwellinghouses. Now-a-days it is difficult to understand where the congregations came



Street in Wisby.—E. W. M.

from to fill the large churches. From the side-by-side position of two of these large churches they are called, if I pronounce it rightly, the "Syskonkyrken," the sister-churches.

They were dedicated, the one on the left to St. Drotten (Holy Trinity), and that on the right to St. Lars (St. Lawrence).

They are said to date from the 12th century, and are therefore about 100 years older than St. Nikolaus. Both churches have huge towers, and they quite dwarf the modern houses. The towers were once probably used for defensive purposes. Let us now turn into St. Lars, the church on the right. The church of St. Lars, or St. Lawrence, is 106ft. long and 76ft. wide, and is of lofty proportions. It is built in the style of a Greek cross, and the central dome is supported by pillars. The

masonry looks so good, and so well put together, that it may be expected to stand for many long years, notwithstanding that it is 700 years old.

From St. Lars we walk through another old street, and as the streets are all paved with round cobbles, walking, according to Mr. Wood, in "ordinary boots is an expiation, severe as any practised by ancient monks." An old Hanseatic house is, to-day, the apotek, or chemist's shop of Wisby. The syphons of soda water which were consumed at my little hotel in Wisby were supplied from this apotek.

We now visited St. Catherine's Church, or, as the natives call it, "St. Carina." St. Catherine's Church is of about the



St. Catherine's Church, Wisby.—E. W. M.

same date as St. Nikolaus, the first Wisby church we visited, and although not quite so large as that church, this ruin of St. Catherine is perhaps the most beautiful in Wisby. St. Catherine's was erected about the year 1233 by the Franciscans. Twelve octagonal pillars carried the roof, of which nothing is left but these light looking arches. Most of the floor stones have been taken away for such purposes as door-steps for the houses and so forth. The grass is now the only floor; but Du Chaillu relates that he found one floor-slab, upon which was chiselled the figure of a priest holding a chalice in his hand, and the date 1380. Where are the generations of worshippers whose place is now occupied by the grassy turf and the creeping

ivy? These numerous ruins are striking comments on the mutability of all things human.

Yet one more ruined church, or rather the fragment of one, the Church of St. Olaf, and which stands in the Botanical Gardens. Over the trees are seen the steps of a staircase and the headway above it.

The view from one of the old towers is wonderful! At our feet lies the curious little town, with its narrow, uneven streets, and all around us these quaint and beautiful ruins, while beyond are the far-stretching waters of the Baltic Sea.

Wisby has so much dwindled and shrunk in that about half the space within the old walls is now unoccupied, or used as a public garden. To the antiquarian and the artist, however, Wisby is, as Mr. Wood describes it, an artistic Gothic Paradise.

Bidding adieu to the Island of Gothland and returning to the mainland, we now go twelve or thirteen miles south of Kalmar to the little country village of Hagby, to see one of the most interesting and ancient churches in Sweden. This quaint little church is perfectly round, and the conical roof is covered with slabs of wood. There is accommodation for a congregation of about 300, who are seated entirely within the circular part of the church. The chancel containing the altar and the porch have been subsequently added on. It is impossible to say how old this church is. The organist told me that he believed it was originally part of a Viking castle, but this is doubtful, as most of the authorities seem to agree that it was a heathen temple, which was altered into a church on the introduction of Christianity.*

Looking at a ground plan of this curious circular church at Hagby, you have the porch, the chancel or apse with the altar, and the vestry. In the heathen temples, which were all circular, the priest stood in the middle, and the hearers all round him. The graveyards were also round, and the grave-stones and mounds followed this circular form. All therefore—hearers, temple-walls, graves, and graveyard walls—became a series of concentric rings, with the priest as centre. From this the ancient name of the churchyard walls was “Ringmuren,” or Ringwall—a name applied to all retaining walls; even after the walls became square, the name Ringwall was habitually used; thus, a short time ago, we found that the town-walls of Wisby were called “Ringmuren.”

The idea of these circles was carried still further. When people from a distance crowded to the church for a festival mass, tradesmen also flocked thither with their wares, and erected their booths in circle round the outside of the ring-wall.

* The Round Church at Cambridge is very similar in style and size.

In the same way the "lags-man" or judge stood in the centre and administered the law to the people, who closed round him in circles.

There is another of these quaint little old round churches, that at Voxtorp, some two or three miles beyond Hagby. This tiny church is much smaller than Hagby Church, and the porch and altar-recess of Voxtorp are almost as large as the church itself.

All the earliest Swedish churches were of this circular form, but not many are left. They have the "klock-stapel" or wooden belfry, separate from the church, and the hanging bells.



Hagby Church.—E. W. M.

We now reached the last stage of our ramble, the University city of Lund, the oldest and, at one time, the largest city in Skane, the extreme southern province of Sweden.

In Viking times Lund was a very prosperous place. Its prosperity then declined until the foundation of a University here in 1668 by Charles XI., when it rose again, and Lund is now a flourishing city of 15,000 inhabitants.

If I have described Upsala as the Oxford of Sweden, we must speak of Lund as the Cambridge.

They have a new University building, which was completed in 1882. It is in the Greek Renaissance style, from the plans of Hugo Zettervall, Swedish Commissioner of Public Works.

The four colossal figures supporting the portal are, on the

left Theology, next Jurisprudence, next Medicine, and on the right Philosophy.

There are about 700 students at this University. In Sweden no one can enter the medical, clerical, or legal professions without having first taken his degree at Lund or Upsala. The students here differ greatly from those of Germany, in that there is no duelling. There are severe penalties attached to duelling, and it has been long unknown in Sweden.

The most interesting building in Lund is the Cathedral. It is of great antiquity, having been founded about the year 1080. It was dedicated in the year 1145 to Sankt Lars, or St. Lawrence. The style of architecture is pure Romanesque, and the plan is in shape a Latin cross. The colonnades of the towers are handsome open ones. The whole edifice is said to resemble the Rhenish style of the middle ages. We now pass into the nave of Lund Cathedral. The nave is 210ft. long and 70ft. high. The whole of the roof is painted with frescoes, and is supported by nine columns on each side.

These columns are pure round-arched in style; the interior is entirely different from those at Upsala, Linköping, and Skara. A remarkable circumstance connected with this nave of Lund is that the floor is not level; it is crowned, the centre rising about 18in. above the sides, after the manner of the Pantheon at Rome. The pulpit is very handsome and valuable; it is of alabaster, inlaid with marble, and dates from the year 1318.

A peculiar feature of this cathedral is the broad flight of seventeen steps, ascending from the nave to the massive transept.

In a near view of the altar we see a seven-branched candlestick of great antiquity; it is made of bronze, and dates from the 13th century. Before it stands, on a tall pedestal—a dark figure in such deep shadow that it is difficult to make it out—a bronze figure of St. Lawrence, the patron saint of the cathedral, holding a grid-iron, symbolical of his martyrdom. He was roasted to death.

The miserere seats at the back of the altar are very ancient and curiously carved; one shows St. Lawrence roasting on the grid-iron. The lady chapel, on the left, has a tall, elegant pillar.

The lights in the candlesticks are not candles, as we might imagine; they are incandescent electric lights fixed on holders which resemble candles. The whole cathedral is lighted by electricity.

Perhaps the most remarkable feature of Lund Cathedral is the crypt, which is of large size, extending as it does under the whole of the transept and choir. As you know, crypts are very dark and difficult to photograph, but, notwithstanding that, I

secured a photograph which gives an idea of the extent of this crypt at Lund Cathedral.

Brother photographers will be interested to hear that I gave the negative $2\frac{1}{2}$ hours' exposure. The floor is covered with gravestones.

The crypt is 14ft. high, and the vaulting is carried on 24 massive pillars.

According to the legend, St. Lawrence engaged a giant named Finn to construct this building. The giant stipulated as the price of his hire for the sun and moon, or for the saint's own eyes, unless the saint should succeed in guessing his (the giant's) name. Fortunately St. Lawrence overheard the giantess (Finn's



'Crypt, Cathedral of St. Lawrence, Lund.- E. W. M.

wife) pronounce her husband's name while lulling her child to sleep. The saint thus saved his eyes. The enraged giant thereupon tried to pull down the building, but St. Lawrence turned him into stone, in order that he might hold up the church for ever.

The pillar shown is the stone giant, and the giantess is at the opposite end of the crypt, carved in a crouching position.

The cathedral of Lund with its splendid crypt is no doubt the finest church in Scandinavia. It is, therefore, a very fitting termination to our ramble in Southern Sweden.

I will only add that Southern Sweden affords much that is beautiful and of deep interest, and I close my lecture by reading

you a translation of a Swedish student's marching song, for which I am indebted to Du Chaillu, and which breathes the fire of intense patriotism:—

“Hear us Svear, mother of us all.
 Bid us battle for thy welfare, and fall
 Never, never, shall we thee forsake.
 Take our oath, the same in all our fates!
 With life and blood shalt thou be defended,
 The free land which still is ours—
 Every part of the inheritance,
 Thou gav'st us in saga and song.
 And if by deceit, treason,
 Discord, and violence thou threatened be,
 Yet will we believe in the Lord's name.
 As our Ancestors believed once:
 ‘Our God is a powerful fort,
 He is our armour tried;
 On Him in all our sorrows and wants,
 Our hope we will build.’
 Glorious, glorious will it be—
 Victorious in the battle stand—
 Far more glorious if we, however,
 For thee, oh, Mother, do fall!”

NEW BOOK.

DEFINITION OF GEOGRAPHICAL NAMES. With Instructions for their Correct Pronunciation. For Teachers and Pupils of the various grades of Schools of the United States. A Supplement to every School Geography. By DR. KONRAD GANZEN MULLER. New York. 1894. To be obtained from Kurt Moebins, 39, East 19th Street, New York City. 80 cents. 32pp.

THIS little pamphlet gives rules for pronunciation, and gives definitions of names. It is written from a German standpoint, and some of the statements are at least somewhat curious. But generally the book will be useful to those who wish to know the derivations of the names and places—knowledge sometimes very difficult to obtain. Here is a specimen paragraph:—

“The earliest inhabitants of the British Isles known to history were Kelts. In the Keltic language *pen* signified “mount,” “mountains,” and from this comes the PENINE CHAIN—the CHAIN OF MOUNTAINS, BEN NEVIS—MOUNT NEVIS (in Scotland); ABON, hence AVON—RIVER; LOCH (in Ireland, Lough)—Lake: LOCH NESS—LAKE NESS; LOUGH NEAGH—LAKE NEAGH.”

“The Romans held possession of England to the end of the fourth century.

“In their language *cástra* meant a “camp,” and CHESTER, formerly the (DEVAUR) CASTRA—CAMP. Further, we have MANCHESTER, LANCASTER, WORCESTER (the first parts of these names cannot be explained).”

We thought that Man and Lune were easy to explain, and the derivation of Worcester is known.

AN ENGLISH LADY IN SIAM.

By Mrs. (Captain) UNSWORTH.

[Addressed to the Society. in the Library, Monday, March 18th, 1895.]

BEFORE speaking of Siam, I will just mention whence I have obtained the little information I possess about that country. It is a pitiful fact that so few books about Siam have been published yet which are at all reliable. There have been several



written, but the writers have had some other object in view than to give a plain, truthful account of the country and people.

The book, published very recently, written by the late American Minister, Colonel Childs, called the "Pearl of the

Orient," cannot be read with any patience. The language is extravagant, the book is full of errors and of no use to anyone who wishes to become acquainted with this country.

The little I am to tell you now is the result of my own personal observation, and is from conversations with persons who had no desire or interest to relate what was not true.

I visited with great pleasure an old lady in Bangkok, a Mrs. Bradley, widow of Dr. Bradley. She was the first—I cannot say European, because she was an American—but the first lady of Western civilisation who entered Siam. She had been forty-two years in the country when I met her, had worked hard as a missionary, and had been a teacher to some of the princes and princesses. She had often been in conversation with the king, and knew a great deal about the court. She had ceased from any active work when I went to see her, but she had a remarkably good memory, and delighted to tell me about her experiences.

I also met Captain Hicks. He was adviser to the regent who governed during the present king's minority, and is very intimately acquainted with the court and the people, and he gave me very valuable information. The king's physician, Dr. Gowan, who is now in London, and Mr. Morant, the tutor to the late Crown Prince, were frequent visitors of ours, and very often their conversation would turn on the court and the government. So from these friends and many others who travelled up the country and lived amongst the natives I have gleaned information, and I have gone backwards and forwards from China to Siam, staying a week or a fortnight at a time in some of these places, for nearly four years.

Siam is a country undergoing great changes politically and physically. It has been, as every one can see who visits it, a country with a few small cities composed of temples, palaces, and huts; outside these rice fields; then the jungle and immense teak forests. Its resources are rich and great—gold and ruby mines and rich timber forests—but the climate is much against its development; there is no native energy, and the European energy that keeps drifting to the country is soon paralysed with the heat and miasma. But there is a future for the country yet, and whether it will be France or England that undertakes the development, it is interesting to see and note what Siam has been under Siamese rule before its old customs and usages are swept away.

The River Menam (mother of waters) is the central attraction of all life and trade; it is the great highway for traffic, and the great cleanser and purifier of the cities; its tide sweeps out to the sea all the dirt and refuse accumulating therein; it is the universal bath for all the Siamese. The children paddle and

play their games in it; it is the scene of their frolics in infancy, their means of livelihood in manhood, and to many of them their grave in death. At sunset, when work is suspended, there is a great splashing and plunging going on all along the river banks, everybody taking a bath or amusing themselves in the water. The river bar is a great trouble to navigators. The king will not have it dredged, as he, in his ignorance, thinks it a natural protection to his country, as only ships of a shallow draft can cross. Trading ships have to be built specially constructed for that purpose. No large man-of-war can cross, but the king did not take into consideration the small torpedo boats that can do so much mischief; recent events, however, must have opened his eyes. We cannot rush into Siam at railway speed; the ship must be lightened as much as possible, and we must wait until the tide is at its highest—it may be two hours, or it may be twenty-two—and even then the channel is so narrow that if we go a little to the right or to the left we run aground. Many times there are two ships fast aground; once or twice there have been four and five. Some have had to stay seven and eight days, and have every movable thing taken out before they could rise. Nothing can exceed the monotony of lying aground there; there is nothing to see, only in the distance some low-lying ground covered with a scrub, no sign of habitations, no cliffs or green hills rising out of the sea—nothing but water, water all around, and a glimpse of flat low-lying ground with wild shrubs on it.

After crossing this vexatious river bar we proceed up the river eight miles, with nothing to see but low banks until we come to the forts at Paknam. If the tide is late in the day, here we must anchor until morning, because there are no lights on the river to guide us. And now there begins a terrible war, which lasts all night long. All new comers are sorely pressed. The ingenuity of civilised man has devised weapons with which he can annihilate the lion or tiger. Well armed he need not fear the elephant or bear; but, alas! his inventive powers have failed before this formidable foe, and we have no adequate defence against the terrible mosquito. Here they breed and swarm in millions in the swampy ground on each side of the river, and any light attracts them at once; they come swarming round the ships, and however well covered with armour you may be they find some uncovered place, either hands or face, and all night you may do your utmost to keep them at bay, only to find yourself in the morning sorely wounded in flesh and broken in spirit.

Here at Paknam the customs officers board the ships; they take great precautions against the smuggling of opium, ammunition, or firearms. The officers, armed with bloodthirsty-looking swords, come on board and immediately look round for the most

comfortable place on deck, and at once fall fast asleep; they sleep night and day; no rest from sleep do these vigilant watchers take.

Also at Paknam the railway to Bangkok, the capital, which was opened last year, begins. The Siamese, unlike the Chinese, are ready to adopt any new thing; and the court has been amusing itself very much with this new railway. The railway track lies over marshy ground, and it makes a better pathway for pedestrians than the old pathway, which was often under water, so they use it frequently; and not only that, but when tired with walking in the heat of the sun they lie or sit on the sleepers. An approaching train does not rouse them in the least; like all Orientals they are unmoved by anything. Besides, they have never seen a railway accident, or anyone killed on the line, so, like children, never having seen the danger, they do not believe in its existence. The embarrassed engine-driver may whistle as he likes, they sit unconcerned, until, at last, he is obliged to spurt boiling water from the engines over them; then they will move and let the train pass on.

But we will proceed up the river in the ship. The river banks are very low, and fringed at the water's edge with palms and huge tree ferns; the mango and tamarind trees hang over, and the banyan tree, with its branches hanging down and taking root again, makes quite an entanglement of roots and branches. At night these trees are lit up with thousands of fireflies; on a dark night they glisten and sparkle like the firmament. But in the morning the river is alive with buyers and sellers. We very soon come to a market lying in the river—all kinds of Eastern fruits and vegetables and crockeryware are piled up on floating rafts, the sellers sitting cross-legged beside their wares, and the buyers rushing about in small canoes propelled with one oar.

If the officers in charge of steamships like to be mischievous and go full speed, leaving a big swell in their track, they have the fun of seeing the floating stalls swaying up and down, banging against one another, fruit and vegetables rolling off into the water, with the stall-holders shouting and plunging into the river to save their wares!

We then come to more floating houses and houses on piles. Europeans find the advantage of living on the river to be that they get more breeze and fewer mosquitoes; so here and there, among the floating mat-shed erections, we see a neat painted wooden house on piles; it has to be approached by a boat, and you enter up a staircase on to a wide verandah. The sitting-rooms and bedrooms all open out of this verandah. No windows, no fireplaces are needed in this country—very strange un-home-like residences they are to anyone coming fresh from England, yet they are suitable for the climate.

Here and there amongst the palm trees, and under wide-spreading tamarind trees, we see white-washed temples, with fantastically-shaped gilded roofs; they look very picturesque amongst the trees; they have a style of architecture peculiar to the country, which is more prominent in the shape of the roof, which is a sloping Gothic roof, with all the corners branching out and turning up; one roof is surmounted with another smaller, and then a smaller one still. These buildings give quite a character to the country and are very numerous. It makes Siamese architecture quite distinctive from that of other countries.

As we get to the city of Bangkok the sides of the river are lined with timber and saw mills and rice mills, with tall chimneys and black smoke oozing out. This is European enterprise; they quite spoil the scenic effect on the river, but not any more than the mean, dirty, bamboo huts that line the river sides. The Siamese have no medium respectability; it is all either gorgeously gilded palaces, and fantastically-adorned temples, or filthy-looking huts. A great many of the shopkeepers have their shops right on the river. Some of them are neatly arranged, with a platform in front, on which you land from your boat. All the family are lounging about this platform, the wife carrying on her domestic duties, washing-up the cooking utensils by dipping them into the river; the clothes (what few they wear) go through the same process; and the children, naked, are sporting about this narrow platform, or sitting on the edge with their feet in the water.

It is very convenient for a shopkeeper who wishes to change his place of business; if he thinks there is a more desirable and more frequented spot, he just unmoors his floating shop and has it towed to the place he wants, without disarranging his wares.

Branching off from the river are innumerable canals, or creeks—the Siamese call them klongs—the banks of which are lined with houses and shops; they make a canal where we would make a road or a street. Up some of these klongs there are very pretty views, especially at sunset. Graceful ferns and palms, bamboo trees, with their branches dipping into the water and reflected therein, and between the branches the sloping roof of some house or temple is visible. But many of these klongs, or canals, in the most frequented part of the city, are the reverse of pretty. They are just like a large open sewer running down to the river, full of filthy garbage. When the tide is low there are the black slime, the naked children playing in it, and the dirty huts on rickety piles leaning forward as if they wanted to slide down into the mud; sometimes a dead body comes floating down, and plenty of dead animals.

It is very lively on the river in the city. Here are

ocean-going steamers and sailing vessels moored amid-stream, or tied up to the various wharves, whilst an endless variety of native craft are darting about—narrow boats, like canoes, propelled with one oarsman, hawking fruit and betel; pretty little house boats, fashioned something like the Venetian gondolas, with four, six, or more rowers, standing up, dressed in bright uniforms, according to the rank of the family they belong to; the rice boats from far up the country, of very peculiar construction, flat-bottomed, to go through shallow water, and wide, bulging-out sides, roofed over like houses. In the rainy season, when the river is full, the large teak wood rafts, about 1,000ft. long, come floating down, with huts for the steersmen built on them. Small steam launches and ferries, running up and down from various places, all combine to make the river scene pretty and interesting. One enthusiastic newspaper correspondent pronounced Bangkok to be the Venice of the East. It may resemble Venice in the amount of water traffic, but it would require a great stretch of imagination, and the help of some glorifying and transfiguring tints from the setting sun, before we could allow the comparison; but no doubt it bears the same relation to the East, where filth and squalor predominate, as Venice bears to the refined and cultured Europe.

There are a few well-kept houses of business and private residences bordering the river, but not many, and these in no way resemble the marble palaces of European Venice. The general aspect of the river banks is dirty disorder—rotten piles, with untidy-looking floating houses, mat-sheds, and bamboo huts, right up to the king's palace. The palace walls enclose many buildings, offices, temples, private residences, gardens, and residences for the sacred white elephants. The attractive part of these buildings and the great ornamentation are in the roofs, which are very gorgeous. Some have tall pointed pinnacles, all gilded; some are covered with a fantastic pattern in porcelain, with little gilded peaks, which look dazzling in the sun. Viewed from a distance these buildings realise all that has been written in glowing terms of Eastern palaces, but near to the charm is not so vivid, as there is much tawdriness about them. Whilst remaining on the river the filth and refuse are not so prominent; the tide sweeps all away. But leave the river and take to the roads, oh! the offensive sights and smells that greet one's eyes and nose—offal and waste of every description thrown in front of the houses in the public streets. But Nature is kind and very luxurious here; in a short time these heaps of rubbish are covered with a growth of grass and creeping plants. The principal shops are like those on the river—one large room open to the street, no doors or windows, the family living there, and the domestic arrangements mixed up with the business of selling.

For the last ten years the Siamese have been making roads, and now there are some good roads running through the city, with some large brick buildings; but these last are so wanting in substantiality that in a year or two they look quite dilapidated.

Sewerage is a thing quite unknown in any Eastern city: each side of the street is an open ditchway, along which the dirty water, after many wanderings and gatherings up of the refuse, at last reaches the river.

Bangkok is a city where all the municipal arrangements are carried on by the princes, the king's brothers, who are placed over the public works departments.

Many of them have been educated in Europe, and so introduce many European customs with most ludicrous effect. The policeman who figures in the Christmas pantomime is not so ridiculous as a Bangkok policeman. They are short, meagre-looking men, about 5ft. 6in. in height, dressed in navy blue cloth uniforms with leather belt and truncheon. But with being accustomed from infancy to lolling about in a hot sun without clothes, or just a strip round the loins, this uniform is a terrible burden to them, especially the hats and shoes, which they dispense with as often as possible; and big rents in their jackets and trousers add greatly to their comfort, so are not despised either. Generations of ancestors lounging in the sun have not been conducive towards producing an active athletic race of policemen; they cannot under any provocation stand up erect; leaning or lying flat on their backs in the street is their favourite position. How far they go towards checking criminality I do not know.

Bangkok is a modern city. It is not more than 250 years old. It has risen to importance through the ever-increasing exportation of rice and timber. It is not purely Siamese, being a mixture of all Eastern nations, the Chinese being very largely represented; and the European influence is very prominent. The rice mills for cleaning the rice, and the sawmills, are all fitted up with modern machinery, and are the outcome of European enterprise. There is a fine naval dockyard entirely managed by English engineers, and the regular lines of steamers running here constantly are all British. I must just mention that fifty years ago the Siamese had a fine fleet of sailing vessels, built in Bangkok, of teak wood; but the steamers have taken away their trade, and that industry has died out. The ship-building yards are quite deserted and silent now.

But, if we wish to see a real Siamese city, we must leave Bangkok and go to Ayuthia, the old capital, before Bangkok was thought about.

It is sixty miles farther up the river. The scenery going up is monotonous—no variety at all; it is a flat country. In the months of October and November it is all under water; the

river rises and floods the country for miles, so we can understand the reason for living in floating houses and on piles. But how can any one describe Ayuthia? It is so different from any other city in the world, and entirely Siamese.

The inhabitants live principally on the river in small houses of bamboo, roofed with Atap palm leaves. In some parts there is only a narrow passage for a small boat, the river is so crowded up with their houses. The trade seems to be buying and selling, and the principal things sold rice and fruit, with a few very simple cooking utensils.

There is an old palace here which illustrates how much richer the kings must have grown with the increase of trade. This palace is nothing like in magnificence to the one in Bangkok. The buildings here are like huge barns, with a rude kind of ornamentation, and the inhabitants must have lived in a simple manner.

The principal objects of interest here are the tame elephants—a large number are kept for hunting the wild ones—and the elephant kraal, which is a large enclosure of huge piles. Occasionally there is a great elephant hunt; the court comes up, and crowds of other people interested in the event. On an open building on a slight eminence the court and the guests can watch the tame elephants catching the wild ones, and driving them through a narrow entrance into this enclosure.

The elephant is an important personage in Siam. The sacred white elephants reside in the palace. But it would require some paint or whitewash to make them what we call white. They are more buff colour. However, Barnum thought one of them a desirable addition to his show, and offered a fabulous sum for one. But it was too sacred, and he could not buy one.

The temples are very numerous; their triple roofs and pagoda-shaped spires are the most conspicuous objects in a bird's-eye view of these flat cities, and in journeying through the country, at very short intervals are seen these sacred edifices. Anyone who can afford and wishes to gain merit in this world and the next builds a temple. They are often built in nice shady groves, and afford a pleasant and cool retreat out of the glaring sunshine; but the pleasure in visiting them is somewhat marred by the number of diseased outcast dogs that howl round the entrance. The Buddhist religion strongly enforces kindness to animals, and so the priests, with a mistaken kindness to humanity, keep alive all the wretched dogs that flock around these places.

We can, however, visit the king's temple, which is enclosed within the palace walls, without that annoyance. This temple is in the palace in Bangkok. To give a detailed description of this temple would read like the account of Solomon's temple in the Scriptures.

The floor is of silver, the massive doors of carved ebony inlaid with pearl; the principal statue of Buddha is of green jade stone; some call it the Emerald Buddha, but that is a mistake; however, the value of the stone alone, apart from its sacred character, is fabulous. The altar, in the centre of which is the priceless statue, is covered with gold and silver ornaments. There are innumerable gold Buddhas decked with priceless gems, sapphires, and rubies glittering as eyes or decking their bodies. There is a tree of pure gold at one side of the altar, and one of silver at the other.

This temple is visited by the princes and numerous governors of different provinces, and, like European churches, there is a collection box near the door. But, instead of the usual sixpenny-bit or a shilling, this box is the receptacle of diamonds, rubies, and sapphires. I cannot convey any true idea of the wealth that is displayed in this building.

Another temple which is very notable, and which we cannot pass without some attention, is that of Wat-Sah-Ket, the description of which is not so interesting as that of the king's, but rather more gruesome, because here are celebrated the last solemn rites of the dead.

Cremation is the prevalent way of disposing of the dead, and everyone whose relations can afford to buy wood is cremated here, with as much chanting and prayer by the priests as they can afford to pay for.

But for the poor people, who cannot afford wood, there is waiting a crowd of hungry vultures and pigs. The trees, the spires, are covered with these repulsive-looking birds; there they sit brooding, with their ragged feathers and cruel talons, until a body is thrown into the enclosure, and then they come trooping down to their horrible meal.

It is not at all desirable to visit this temple; strong men turn sick; the sight is too disagreeable to describe. But everyone must admit that in a city like Bangkok, where the ground, being swampy, is not in a condition to favour burial, there must be some speedy way of disposing of the dead, and until the Government undertakes to cremate them, free of charge, we must be grateful to the vultures, and dogs, and pigs, for acting as useful scavengers and removing quickly what would otherwise create disease.

The Buddhist religion requires that every man, rich and poor, from the king down to the lowest beggar, must enter the priesthood for a portion of his lifetime. They mostly enter when in their teens. They are supposed to go through a course of bodily privation and to practice self-denial, studying and reading the sacred books. Some of them, after they have gone through this as a course of education, leave the priesthood, whilst others remain a lifetime.

They live in the temple, and do not provide themselves with either food or clothing. The Government supplies their clothing, which is rather a picturesque costume. It consists of a long strip of amber-coloured silk wound round their bodies, and falling in graceful folds; and they beg their bread from door to door. Early in the morning it is interesting to watch the priests setting out on their rounds begging their daily store, some along the roads, some in boats, with their heads shaven smooth. It is a marvel they do not get a sunstroke, as they wear no covering whatever on the head, and sit in an open boat with the sun beating down on them. Everyone is supposed to give readily to the priests of what they possess. About nine o'clock they return with their provisions for the day, for, like the wandering Israelites in the desert, they must not keep anything towards the next day; but whatever is left over is distributed to the dogs and cats and birds who haunt the temples for the purpose of picking up the remnants.

The principle seems very beautiful that there should be such retreats from the degrading cares of buying and selling and money getting.

Many people who have lived in Siam long say these priests are an evil. There are about 22,000 in the country all living in idleness; they do nothing for the good of the country, and any one who wishes to live a lazy vagabond kind of life can do so by entering the priesthood.

Travelling up the country we find the people very amiable. Instead of the scowling looks and suspicious, threatening attitudes of the Chinese, we meet with smiles and friendly advances.

Some of the women of Siam are rather pretty when young, about eighteen or before that—with large liquid eyes, small round faces, pretty mouths and teeth, and they have a very graceful carriage, whether or no because they wear such loose clothing, and are accustomed to swimming and throwing themselves about unfettered from being quite young children, I do not know. But the attractive period is of short duration, and nowhere can old age look more hideous than it does in Siam, especially among the women—who have black toothless gums, yellow parchment skin hanging loose in bags, and dull yellow eyes. The universal custom of chewing the betel, which is indulged in by all from the queens and princes down to the poorest peasant, quickly destroys any claim to attractiveness, rendering the lips thick, and making them and the gums and teeth as black as coal.

Their dress is very simple; it needs no tailor or dressmaker to cut out, as it only consists of a length of cloth about six yards long and one yard wide, without buttons or tapes or hooks or eyes. This they twist round their waist in a very ingenious fashion, crossing it and tucking it up until it forms a kind of

divided skirt. This is called a penung. Then they take another long strip, narrower, about a quarter of a yard wide, which is wound round the upper part of the body, but not over the shoulders. The men and women dress alike; but the royal family and the nobility, instead of a narrow strip of cloth wound round the upper part of the body, wear jackets; and the ladies' jackets are different from the gentlemen's, by being trimmed with lace and ribbons, but the lower part of the dress is just the same among all classes, both for men and women, only that the upper classes use richer material, and they also wear shoes and stockings; but these are of recent adoption since the Siamese mixed with Europeans.

Among the working population of Siam the women have better business qualifications than the men, and they do the largest proportion of the buying and selling. In the markets in the city the women's voices are heard louder than the other sex bargaining and arranging sales. But this is not peculiar to Siam. Manchester markets furnish instances of this kind, and we cannot help remarking that human nature seems pretty much alike all the world over.

The Siamese are not an industrious people, and if the country is to be opened up it will not be by native labour; they are fonder of lying basking in the sun than working; even as house servants to Europeans, where the duties are light and wages liberal, they are very reluctant to exert themselves. European residents have to humour them if they wish to keep them as servants, as they will leave at once on the smallest pretext.

There are scarcely any native industries. There is some basket-making done by the prisoners, and a very coarse kind of hand-spinning and weaving is done in some of the houses up the country. But if it were not for the large importation of Chinese into the country—as many as from twenty to twenty-five thousand flock into Bangkok every year—it would be impossible to carry on the amount of trade that there is. The rice fields are cultivated to a great extent by Chinese, besides the rice being cleaned and prepared for shipping by them.

But it is only fair to say that there are many influences at work to discourage them from being industrious. One very important thing is, the laws are not framed to protect small property holders and petty tradesmen.

The taxes are farmed out, divided into districts, and sold by auction to the highest bidder, who is at liberty to extort all he can from the people.

Again, robbery with violence is very frequent up the country, and during the last few years has been increasing. Away from the city the country is infested with robbers, and the Government seem to have no adequate means of putting

them down; and latterly this kind of robbery has assumed alarming excesses.

So the Siamese working-class argue among themselves, not without reason.—“Why should we toil and save when the tax-gatherer claims such a large amount, and the rest may be torn from us violently, even if we escape with our lives?”

Besides, in a climate like this their wants are so few and so easily supplied. The bamboo tree, which grows wild, will supply material to build them a hut, roofed with palm leaves, to shelter them from sun and rain; rice is plentiful and cheap; many fruits grow wild; fish can be obtained easily from the river; clothing they have little need of—just a strip of cheap cotton; firing they need none, only a few twigs to cook the rice and fish. All these things can be obtained with little labour, so that we see there are few inducements for them to be anything but indolent.

The public works, roads and canals, and some buildings, are made by the prisoners and slaves. It is a common sight to see them working in gangs chained together. History says that the present king abolished slavery when he began his reign, but I know that slavery exists yet to some extent; perhaps there is some limitation that did not exist formerly. A man can be seized as a slave, as well as his wife and family, if he is unable to pay his debts, and he remains in slavery working for his creditor, or hired out by him, until the debt is paid. I know of one or two instances where persons have acquired servants by paying the creditors, and keeping the debtor in bondage until the slave had wiped out the debt. This also must be a great hindrance to small tradesmen, because a man will scarcely dare to risk much with such an alternative before him if he fails to meet his debts.

Governors of provinces also hire out their prisoners to large rice growers; this is a cause of a great amount of misery, but we cannot enter into details of that now.

In Siam there is no respectable middle class; above the toilers there are the merchants, and among these, it is rather strange and a matter for consideration that there are so few Siamese. One or two Siamese noblemen are exporters, but the majority of large firms are European; there are also many rich Chinese merchants.

The princes and nobility form a large class. Among the nobility the titles of Phra and Phya are the principal. Some of these noblemen rise from very low positions, mere coolies, sometimes slaves. I was amused and interested at one instance. I know a European gentleman who had a stable boy, a dirty coolie. He afterwards became a favourite servant to one of the princes, who was sent to London on an embassy. This servant became one of his suite, had a title given him, and in a short

time after being stable boy became a guest of the Queen at Windsor; he also attended the Prince of Wales' garden parties and levées as a distinguished personage. Truly a man is not without honour save in his own country and among his own people!

I cannot pass on without referring to another of these noblemen who has risen from a low rank through becoming a favourite. He is a well-known character among Europeans, because he is one of the few Siamese who trade. He is a large exporter of rice, as well as being Governor of Paknam and Koh-si-chang, and caterer to the king. His name is Phya Sa Muet, but Europeans have named him Fat Sin, a very appropriate name for him, as he is as broad as long.

This nobleman's wife is said to own a lot of slaves, and she is said to make a lot of money out of these slaves or servants.

A great many of these noblemen have been educated in Europe at the leading Universities. The majority of them speak English, and they are very quick at acquiring European ways. They have a very affable and gentlemanly manner of address, and they are very pleasant to talk to.

But their education does not seem to have any permanently good effect on them. After returning from Europe they soon fall back into their old barbarous customs—chewing the betel, eating without knives or forks (just using the fingers), and many other more repulsive customs. But I have heard many a one say, who has seen much of Siamese life, that this is the fault of the grandmothers.

The grandmother is a very important person in a Siamese household—she keeps the purse, arranges the marriages, finding the wives for her grandsons, besides superintending all the domestic arrangements for them. Europeans do not pay near so much homage to grandmothers as do these Orientals. It seems very noble of them to render such filial respect and deference, but, at the same time, these grandparents are very despotic, and, like many aged persons, they are inclined to be too conservative. It is they who keep up all the old barbarous customs; and if a youth coming home from Europe tries to introduce more refined habits, they begin a system of persecution, and do not let him rest until he is married to a wife or wives of their choosing, with a household entirely under their management. Indeed, it is the opinion of many a one that there can be no domestic or social reforms until the grandmothers are deposed from their tyrannical rule.

All Government places, such as Minister of War, Foreign Minister, Minister of Finance, Ambassadors, and all positions of that kind are filled by the king's half-brothers. They are a large family—innumerable—and they know they must make their fortunes whilst this king is on the throne; for the next

king will have his sixty or seventy brothers to find places for.

Most of these princes have had a European University education, and are very polished and courteous in their bearing; but in their characters they are so like spoiled children who have too much money to spend, and buy anything and everything they see which takes their fancy. They travel through England and see the stately ancestral homes; they go back and at once begin to build a mansion like some English nobleman, employing architects and artists to make it like, both inside and out. But, before it is finished or furnished, they are quite tired of the toy, and it is abandoned to fall into wrack and ruin. They also see that in Europe we honour artists, scientists, and men of learning, so they invite to the Siamese courts artists who have not yet made a name in Europe, and who find it worth their gain to go, and other men from our universities and colleges. At first they load them with gifts and titles; but they have no real veneration for genius, and by and by they begin to suspect that they have made too much of these learned men; then they turn cool, and at last send them away.

They buy fine yachts and small gunboats—they are like other toys. At first the court makes use of them, and they are well fitted up and manned; but soon it becomes no one's business to look after them. The court tires of going sea trips, and so the boats lie in the river until the white ants get into them, and in a few years they are utterly worthless and quite unseaworthy.

There are two newspapers in Bangkok, conducted by Englishmen, and any fair criticism on the management of public affairs by the princes is resented, whilst flattering remarks are rewarded.

The king, like most Oriental monarchs, is despotic; he, being the representative of Buddha, can do no wrong. Personally, he has been very well liked by foreigners, as well as his own subjects. At the beginning of his reign he made several reforms. He has shown himself to have a liberal mind, opening the country out to foreign traders; he has been kind and generous to the missionaries, giving them grants of land to build schools on; allowing the lady missionaries access into the palace, and made them teachers to his children. But the last year or two he has been suffering bad health, and has withdrawn himself from public life. He is not much seen now, and his brothers have more control over public affairs than ever.

Like most Eastern harems, the Nangharm, or Women's Palace, excites curiosity and wonder in us, as our ideas of domestic life and marriage are so very different from theirs.

The palace consists of three walls enclosing a square; within the outer wall and the second one there are many offices, the arsenals, and the stables for the royal elephants; within the

second and inner wall are the reception rooms, libraries, king's temple, and some of the king's apartments; then in the inner enclosure, the centre of the three walls is the Nangharm or Women's Palace. It consists of many buildings, streets, and gardens; into this enclosure no man but the king ever enters. There are not less than two thousand women all living together here—aunts, sisters, and wives of the king, with their children. The king has two wives who are called queens, the Phra Nang and Somdetch Phra Nang; these must be of equal rank as himself, so he married his two half-sisters. One of them is the mother of the late Crown Prince; the other was drowned a few years ago in the river. She was drowned in sight of hundreds of spectators, but as her person was sacred, no one but the king was allowed to touch her, and so through the capsizing of a boat she was drowned without any attempt being made to save her. Besides these two queens there are hundreds of concubines. Every nobleman aspires to have one daughter at least occupying that position. They do not give them any name or title, but they just refer to them as being in the palace. Some of these concubines are mere slaves who have attracted the king's attention, and are raised up to be the favourites for a short time. Some of them never see the king, but remain shut up for the rest of their lives.

The old women keep guard over the young ones, and if anything in their conduct displeases them they do not fail to punish them, thrashing them and shutting them up in close confinement, or subjecting them to a variety of tortures.

Of course it goes without saying that they possess immense quantities of jewellery and valuables. One or two European ladies make quite a large income by getting into the palace and trading amongst these ladies. Some of these concubines keep slaves, and employ them in working outside making money for them, and they invest their money well, and some of them are quite rich through their investments. Their lives must be miserably dull and monotonous in the extreme. Most of them have no education whatever—cannot even read or write—and have no occupation. No wonder that, occasionally, a faint whisper of some scandal floats out through the palace walls about some princess eloping with some young priest; but all these rumours are soon put down, and no one knows but the old women in the palace what becomes of such persons.

The evils of this plurality of wives is very apparent to Europeans, and Mr. Morant, the tutor to the late Crown Prince, thought to counteract this custom by educating the women; he thought that by raising their self-esteem and moral standard they would refuse to become the slaves of the men, and that polygamy would die out. So he formed a high school for the daughters of noblemen, and brought to Siam several ladies from

Girton to instruct these young girls; but I am sorry to say the school is not a success as regards the number who seek to be taught, and the custom of polygamy seems too firmly rooted to be given up in this generation. Missionary ladies have had free access into the palace for over forty years, and they have not been able to effect any change in that direction. The king is not to be envied by any means in his domestic life. The Women's Palace is the centre of innumerable intrigues; accordingly, as they are kept ignorant, and all control or responsibility over their own destiny is taken from them, they must resort to plotting and scheming to gain their desires.

When I left Siam, six months ago, before the death of the late Crown Prince, the succession to the Crown was a matter for a great amount of political intrigue. Formerly there was no fixed rule of succession. The king was allowed to name his successor, and after his death a council of state assembled to choose a king, or to confirm the late king's choice. As often as not it happened that the crown descended to the next brother.

But the present king wishes to make it law that he shall be succeeded by one of his sons; he chose another of his sons, and called him the Crown Prince, immediately after the death of the last prince. Before the death of the late prince there were great divisions in the palace. There was the queen's party; she was supported by her own brothers, the king's half-brothers; then there was another party which was for the king's own brother.

How they are divided now I cannot say as the prince's death may have altered the political aspect, but, any way, it appears as if the declining years of his present majesty were not to be very peaceful ones.

Many Europeans in the country fear that there will be a revolution of some kind at the end of the present reign.

In the Siamese court there are several very interesting ceremonies, probably unlike anything belonging to any other country, a pageantry peculiar to Siam, and of great magnificence.

One of the principal of these is a royal cremation. As soon as one of the royal family dies the body is embalmed and lies in state for one year or longer, sometimes two, so long as the time for mourning lasts, and according to the amount of preparation necessary. The preparations are on a vast scale, and take a long time to complete, as the governors of provinces are compelled to contribute a certain amount of timber, logs of a certain length which are hard to find, and then difficult to convey to the capital. When all is complete and a funeral pyre laid, all the courtiers assemble with their magnificent display of gold and silver jewellery. The royal family are seated on a raised platform, and then there are priestly processions, chanting, and praying. The body is then con-

sumed. This is followed by feasting and revelry, and the king lavishly distributes precious stones and gold ornaments to all those present.

Then there is a royal hair-cutting. This is an occasion for very great rejoicing. When a boy attains the age of fourteen or fifteen his head is shaved, and then he enters the priesthood. The poorest family in the kingdom try to have some kind of a festivity when this takes place, all the relatives assembling. The priests come to the house and pray and chant, after which there is great feasting.

But when it is one of the royal family, or the Crown Prince, then not many other courts can exceed such a magnificent and gorgeous spectacle. The ceremony lasts for a week—a continued succession of religious rites, with processions and feasts. There is the sacred bath in the river, where the priests dip the young prince. But the great event and climax is when the hair is cut. There is a throne prepared purposely. It is a most sacred and unique ceremony. The rich profusion of gold and silver ornamentation, the display of precious gems, diamonds, sapphires, and rubies in such gorgeous array would rival, if not surpass, the description given of the splendours of Solomon's court.

Amongst the regalia of Siam we cannot help but notice the peculiar shape of the crown. It is of five tiers. There is also the five-storeyed umbrella, which is carried over the king. Both are peculiar and distinctive features of this most interesting court, which reminds one of the Arabian Night's Entertainments more than anything in the world.

Another elaborate spectacle is when the king, attended by all his nobles, visits every great temple. This takes some weeks to accomplish, is an annual event, and is another series of grand processions. It is a water procession, and the barges which are kept and only used on this occasion are most sumptuous. They are richly carved and gilded, with silken awnings. They are long narrow boats about 100ft. long, rowed by over 150 oars-men with gilded oars. The whole procession is another scene of barbaric splendour, and recalls the stories of Aladdin and his Wonderful Lamp.

In conclusion, I must say I have tried to give as truthful an account as I could of all I have seen and heard in Siam. Whether it is a pleasant one or not I do not know. It seems to come so easy to us to criticise and find fault with other nations than our own. It has been said by foreigners, who have visited us, that "England without the English would be a most charming country." And so, I am rather inclined to say that "Siam without the Siamese" would be most desired.

They have their own outlook, which is very different from ours, and which perhaps appears distorted to us. What they

treasure we despise, and what we treasure they despise. An educated prince of Siam made the remark that "Westminster Abbey was a disgrace to a civilised country, so dirty and out of repair."

So it seems as if it would puzzle the profoundest philosopher to say who was right and who was wrong.

I offer these few remarks reminding you all that it is perhaps because European habits and modes of thought are so deeply impressed on our natures that we are not able to sufficiently appreciate Oriental ones.

NEW BOOKS.

AN ENGLISH GRINDELWALD: BOLTON WOODS AND WHARFEDALE. By JOSEPH J. GLEAVE. Manchester: Marsden & Co. Price 3d. 1894.

A LITTLE pamphlet describing Mr. Gleave's rambles in Bolton Woods and Wharfedale.

DEPARTMENT OF THE INTERIOR. BULLETIN OF THE UNITED STATES GEOLOGICAL SURVEY. No. 118. Director, Mr. J. W. Powell. A Geographical Dictionary of New Jersey. By MR. HENRY GANNETT. 132pp.

No. 119.—A Geological Reconnaissance in North-West Wyoming. With Coloured Geological Map and four Plates of Sections of Coal Seams. 72pp. MR. G. E. ELDRIDGE.

No. 120.—The Devonian System of Eastern Pennsylvania and New York. With Maps of Geological Stations in Eastern Pennsylvania, New York, and along the Delaware, Lackawanna, and Western Railroad, and Photo of Fossil Plant (*archæopteris obtusa*, Lx.). 82pp. MR. CHARLES S. PROSSER.

No. 121.—A Bibliography of North American Palæontology, 1888-1892. MR. CHARLES R. KEYES. 252pp.

No. 122.—Results of Primary Triangulation. 17 Plates, showing Results of Triangulation. 412pp. MR. HENRY GANNETT. Washington Government Printing Office, 1894.

THESE bulletins of the Geological Survey of the United States are most valuable. Each of the five numbers is a monograph, and is illustrated with maps and diagrams, where they are required, to elucidate the subject.

No. 118 is really an index of places to the Geological maps of New Jersey. No. 119 is a very interesting memoir on the coal, petroleum and minerals of the region. No. 120 is a description of the area of the Devonian Rocks in the districts referred to. No. 121 is a valuable reference book, and No. 122 is useful as exhibiting the methods and results of the work carried out by the Geological Survey of the United States of America.

NOTES ON POLAR RESEARCH.

By Mr. E. DELMAR MORGAN, F.R.G.S.

[Addressed to the Society in the Library, Wednesday, March 27th, 1895.]

THE interest attaching to Polar exploration at the present time has probably never been surpassed. Every scrap of news relating to the expeditions now in the far North is eagerly seized upon and telegraphed to all parts of the world; for the mysterious unknown region round the Pole, which has daunted the bravest men for centuries, is not the property of one nation, the heritage of a chosen people, but belongs to all. Whether the explorers are English, or Americans, or Swedes, or Norwegians, they are the pioneers of science, which knows no nationality, and the prize they are all striving to win, inspired by a generous rivalry, is the last great reward the world can offer to her adventurous sons.

Recent explorations have shown this goal to be by no means impossible of attainment, for methods and appliances are vastly improved, and the difficulties which stopped previous explorers may now be overcome. Who would have thought it possible a few years ago to pass an arctic winter in the 80° parallel in a comfortably warmed house? Yet this feat has been accomplished by Lieutenant and Mrs. Peary within the last two years. It is true that Greely and his party wintered two years in succession in Lady Franklin Bay, in the north of Grinnell Land, in 1883-4. But this was not without great discomforts, and the loss of one or two lives; and Mr. Leigh Smith established himself and his crew in winter quarters on the south coast of Franz Josef Land in 1882. But in this last case it was the loss of their ship, the "Eira," that obliged them to take refuge on shore and wait till the following spring before they could attempt a return in their boats. Lieutenant Peary, far from being reduced to such straits, landed in Mc.Cormick bay with the express purpose of wintering in that remote spot and organizing his sledge journeys early in the following year. The equipment of an Arctic expedition in these days is very different from what it was a generation ago—boats and sledges are lighter and stronger, provisions more condensed, clothing warmer and more suitable. Every Arctic expedition adds something to the experience gained in the past. It may be a bold statement, nevertheless I believe it to be true, that not many years will elapse before the North Pole is reached, and its mystery cleared. At all events, we shall know, if it be impossible to get there, why it is impossible.

This year (1895) promises to be a memorable one in Arctic annals, for there are no less than three expeditions in the field, from all of which we expect a large accession to our knowledge of the Polar region. The last news of Nansen were dated in August, 1893, from the village of Khabarova or St Nicholas in the Yugor Shar, or Strait, separating Vaigats Island from the mainland. Nothing later is known of his movements and we can only speculate on his whereabouts from the slender information we possess, and from our acquaintance with the man and his plans. Judging from Captain Wiggins' report of the state of the ice in the Kara Sea (Wiggins entered it a fortnight after Nansen), there would probably have been great difficulty in rounding Cape Chelushkin, and Nansen may have been obliged to winter in Dickson's harbour. Whether under these circumstances he pursued his

original intention of navigating eastward along the Siberian Coast to the meridian of the New Siberia Islands, or whether he modified his plans, as Captain Wiggins advised, and entered the pack north of Cape Chelushkin, is absolutely uncertain. The argument in favour of the latter course appears to me well founded, inasmuch as it was ascertained by the Russian scientific expedition sent to the New Siberia group that the sea off those islands is shallow and the currents erratic, indicating the proximity of land, possibly of great extent. Now it is a canon of Arctic exploration that where there is land the cold is greater and the ice-pack consequently more inaccessible. If the "Fram," more fortunate than the "Tegethoff" and the "Jeanette," escapes being crushed, she may drift westward in the ice along the outer margin of the polar basin, and in this way reach the 100° meridian. Such a course would enable Nansen to ascertain how far Franz Josef Land extends to the eastward, and whether, as some suppose, this archipelago or continental mass of land forms a northern barrier to the Kara Sea, preventing its ice escaping northward under the influence of warm currents from the great Siberian rivers. But whatever happens to the "Fram," and even supposing she was crushed and Nansen was obliged to take to his boats and sledges, such is the confidence felt in him and his resources, that we may expect tidings of him ere long. This news will come via Russia where doubtless a good look out will be kept for any traces of his expedition.

Franz Josef Land is being explored from another direction with a better chance of success. The Jackson-Harmsworth expedition was last heard of in August last year, when the "Windward," the steam whaler which took out Mr. Jackson and his party was seen off Nova Zembla in Lat. 75°.45' and Long. 44° E., steaming through an open lane in the north towards Franz Josef Land. Mr. Jackson intended going into winter quarters on its south coast in "Eira" harbour in Lat. 80°4', and in the spring of this year prosecuting his explorations with dog sledges. His plan was to form caches for provisions so as to enable him to proceed as far north as possible and ascertain the boundaries of this land discovered by the Austrian expedition in 1873-4. Mr. Jackson's expedition is well equipped in every respect through the munificence of Mr. Harmsworth; his base on Franz Josef Land is readily accessible by sea; he has taken the necessary materials for a warm house in which he and his party can pass the winter comfortably, and even a stable for his ponies—the first time these hardy animals have been used in Arctic work. There is abundance of animal life to supply fresh provisions for the men, the best preventive against scurvy. Lastly, in whatever direction he decides on exploring, Mr. Jackson cannot fail to contribute to our geographical knowledge.

Far to the west of Dr. Nansen and Mr. Jackson, Lt. Peary U.S.N., and his courageous wife are again exploring the coasts of Greenland. It will be remembered that on his last expedition he made a remarkable journey with dog sledges to the north-east point and discovered that Greenland was an island, not, as hitherto supposed, a huge peninsula of an Arctic Continent. This year, if all go well, he will complete his survey of its northernmost parts and connect his observations with those of Lockwood and Brainard of the Greeley expedition. He will also ascertain how far the archipelago north of Greenland extends towards the Pole, and what advantages it offers to a well organized attempt to reach that apex of the earth. Meanwhile his observations of the inland ice-cap of Greenland, exceeding 5,000 to 6,000ft in thickness, are, from a scientific point of view, extremely valuable. The experience Lieutenant Peary has gained in sledging, the use he has made of snow-shoes, and the rapid rate he has been able to travel over inland masses of ice or snow, lead us to believe that his explorations this year may be as fruitful as the last. Lieutenant Peary is also trying the experiment of ponies shod with snow shoes for Arctic travel.

Let me before concluding this portion of my paper allude to the sea route to Siberia.

Next to Polar exploration I know of nothing more fascinating in the whole range of travel than the voyages to discover a short sea route by the north to China. It was this object that impelled our ancestors in Queen Elizabeth's time to set forth in their small barks, ill furnished in every respect, and brave the perils of the Arctic seas. Arctic navigators even in those early days were divided into a north-western and a north-eastern school. Both thought they were right and urged their views by every argument they could adduce. The Gilberts (Sir Humphrey and his brothers), Gascoigne the poet, Raleigh, Frobisher, Davis, Baffin and others, were of the "Westward Ho" school, if we may be allowed to borrow the title of Kingsley's well known novel. Sir Hugh Willoughby, Richard Chancellor, Anthony Jenkinson, the Burroughs (Stephen and William), Pet and Jackman belonged to the north-eastern school, and were supported by no less an authority than Sebastian Cabot, that experienced old pilot who had sailed with Bristol ships for King Henry VII., along the coast of North America, who had afterwards discovered the Rio de la Plata, served as Grand Pilot of Spain, and who now towards the close of his long life had returned to England, his adopted country, to preside over the nascent fortunes of the youngest of the maritime nations. Cabot favoured north-eastern discovery, and events proved him to be right, though many generations of Arctic navigators have come and gone since he first gave the impulse in this direction. The north-western route meanwhile was the favourite one. No losses or disappointments could discourage its supporters or put a stop to their efforts. It was confidently hoped that Hudson's Bay would open up the much-desired channel to the Pacific, and when this bay was found to be land-locked, a more northerly course was followed by Smith Sound. Here, too, nothing but disaster attended the explorers, as ship after ship was crushed in the ice, their crews decimated by scurvy, and the survivors left to perish in the cold. Such has been the history of north-western discovery, brightened now and again by deeds of heroism and unselfishness. North-eastern discovery has also had its losses and sacrifices from Sir H. Willoughby's time to the present. But political difficulties here stood in the way. While northern America within the Arctic circle was a No Man's land, scantily populated by wandering seal hunters and fishermen, the northern coasts of Asia were the dominions of the Tsars of Muscovy, who jealously defended their rights and title to all that territory from Archangel to Kamschatka. Hence we find that while the Russia Company was encouraged to trade and establish its factories in European Russia, they were debarred from Asia. In the early days of Anglo-Russian intercourse a few voyages were made to the east of the Kanin peninsula by Stephen Burrough, Pet, Jackman, and William Barents. Purchas, in his collection, records how some Englishmen reached the mouth of the Ob travelling overland across the isthmus of Yalmal. But with these few exceptions, and the Dutch voyages of the 17th century, besides those of the Russians westwards from Behring's Straits, no organized efforts were made to open the sea route to Siberia till the latter half of the present century. To Nordenskiöld and his Swedish companions belongs the honour of demonstrating the possibility of navigating along the whole northern coasts of Asia from Barents' Sea to Behring's Straits, and the voyage of the "Vega" in 1878-9, opened a new era in north-eastern enterprise. In 1874, one year before Nordenskiöld first sailed to the Yenisei in the schooner the "Ymer," an English merchant captain, Joseph Wiggins, attracted by the possibilities of this trade route, visited the Kara Sea, a favourite hunting ground of Norwegian walrus hunters for several years previously, and found it navigable. From that year Captain Wiggins has never relaxed his efforts to pioneer this sea route to Siberia and prove

its commercial value. In this he found staunch supporters in the late Sir Robert Morier, our ambassador at St. Petersburg, Mr. Oscar Dickson of Gothenburg, the Russian merchant, Mr. Sibirakoff, and the English yachtsman, Mr. Leybourne Popham. The munificence of these gentlemen has largely contributed to the successful issue of the undertaking. During twenty years of continuous navigation, Captain Wiggins' tenacity of purpose and perseverance have been as remarkable as his skilful seamanship, qualities deserving of all praise, and the secret of success. In 1893 he succeeded in conveying a steamer which took out a cargo of iron rails from Middlesborough for the great Siberian trans-continental railroad and at the same time piloted three Russian war vessels to Yeniseisk. For these services the late Emperor Alexander III, presented Captain Wiggins with a set of silver punchbowls as a mark of his approval. Last year Captain Wiggins was again successful in reaching Yeniseisk, in the Arctic steamer the "Sternjen." His return voyage was however unfortunate, for in passing the Yugor Straits he was overtaken by a dense fog and carried by the current 20 miles to the south-west of his reckonings. Here he lost his vessel only six miles from the western entrance of the straits, near the village of Khabarova. The inhabitants came to the rescue, and by their exertions, Captain Wiggins, Mr Popham, and the crew of the "Sternjen" were safely landed, together with a sufficient supply of stores from the stranded vessel. This happened in October last, and for about three months no tidings were received of them. A relief party was sent out from Yeniseisk to ascertain their fate, and a vessel, the stenmship "Lindesnaes," started from Vardö with a large supply of provisions and clothing in order to assist them. Meanwhile the shipwrecked men were well cared for by the Samoiedes and a kind Russian merchant. They were supplied with warm clothing and transported in reindeer sledges across the frozen tundra to Pastosersk near the mouth of the Pechora. Here they continued their journey on horse sledges to Archangel, which they reached in safety after experiencing great cold, one of the men having suffered so severely from frost-bite as to lose a foot. Captain Wiggins was received with every kindness and mark of distinction at St. Petersburg, where he delivered a lecture before the Russian Geographical Society, in the presence of the Grand Duke Alexander Mikhaïlovitch, the minister of marine, and several distinguished naval officers. At this meeting the possibilities of this sea route to Siberia were fully discussed and its importance recognized as a means of opening up a great trade with Asiatic Russia which has been for so many years isolated from the rest of the world. It was shown that far from being superseded by the railway, now in course of construction, the sea route would greatly benefit and be benefited by the improved land communications, and that it would foster enterprize and industry in all parts of those vast and fruitful regions which have so long and erroneously been regarded as beyond the limits of civilization. Measures have accordingly been taken by the Russian Government to improve by every means in their power the navigation to the Kara Sea. Fog signals and beacons will be placed in dangerous parts of the coast; the salvage stations on Nova Zembla will be strengthened, and the charts wherever they are faulty will be corrected. Finally it is believed that before long there will be telegraphic communication across the isthmus of Yalmal, in order to warn vessels about to enter the Kara Sea of the condition of the ice. And here let it be observed that in Captain Wiggins' opinion it is not the ice that is the chief danger in this navigation, but the frequent fogs, a disadvantage to which we are no strangers on our own coasts, and against which the prudent navigator knows how to protect his ship by the constant use of the sounding line. Here then is a hopeful future for British enterprize, a new field for our merchants, and an outlet for British industry and commerce. To the Siberians, too, the outlook is full of promise. They have eagerly

watched every step in this undertaking, and will be the first to welcome the wares of Manchester and Birmingham, of Leeds and Huddersfield. The mineral resources of Siberia are boundless, its wealth in precious metals, in timber and cereals fabulous. What is wanted is skilled labour to develop these natural riches, heads to plan and hands to carry out those great works, which in other parts of the world are transforming the waste and barren places into gardens of fertility and productiveness.

NEW BOOKS.

GEOGRAPHICAL METHODS. A CHAPTER OF SUGGESTIONS. By ARTHUR MONTEFIORE. 36pp. Price 6d. London: Educational Review, 27, Chancery Lane, W.C.

THIS is a pamphlet on the teaching of Geography, its Methods and Aids; and deals with the divisions of Geography, Physical Geography, Field Work, Models and Pictures, Maps, the relation of Geology to Geography, Historical Geography, the Environment, the Order of Study, Mountains in Geography, Regions and Races, Place Names, Names and Men, Names and Sites, Sequence of Geographical Study.

The pamphlet is full of suggestions, and is written in a pleasant style.

VOYAGES AND TRAVELS OF LORD BRASSEY, K.C.B.. D.C.L., FROM 1862 TO 1894. Arranged and edited by CAPTAIN S. EARDLEY-WILMOT, in two volumes. Price 10s. London: Longmans, Green & Co., 1895.

THESE two volumes may be said to summarise the various accounts of Lord Brassey's voyages. They consist of reprints of lectures, letters to the newspapers, articles in magazines, and copies of logs. There are four maps, or charts, and an appendix with a full index.

This modern Ulysses has voyaged wonderfully. The Mediterranean, Norway, Holland, India, Australia, Cape of Good Hope, West Indies, Canada and the United States, the Baltic, Calcutta, and Bombay have been visited, and Great Britain and Ireland have been circumnavigated, whilst the manœuvres of the fleets in 1885, 1888, and 1889, have been watched at close quarters.

Reading these volumes, one recalls the enthusiasm with which the performances of the "Sunbeam" were welcomed in the graphic narratives by the late Lady Brassey.

Lord Brassey is not afraid to discuss some difficult problems in reference to our colonies, whilst the details must be most useful to others, who desire to emulate his very important services to this country.

His ample means have enabled him to obtain a good deal of pleasure from these various voyagings. Here and there is a touch of pathos, "the touch of a vanished hand" is absent; yet there is in these two small volumes a great amount of interesting and valuable information.

They are volumes to which reference can, with great advantage, be frequently made, and it was a happy thought, on his departure, with a "Sunbeam" to Southern Seas, to give us the benefits of these reprints in a handy form.

A JOURNEY THROUGH ITALY.

By Mr. J. J. GLEAVE.

[Read to the Members of the Society, April 1, 1895.]

NEXT to Palestine, to all devout and cultured souls, is a journey to Italy. We would not call it the birthplace, but certainly it was the nurse of Art, Poetry, and Law. Its very place-names are poetry and music. I must, therefore, crave the indulgence of my more prosaic hearers if my language is somewhat, I won't say extravagant, but warm. The land which has produced a Cicero, a Virgil, and a Dante is worthy of a poet to describe it, which, alas ! I am not.

We reached Italy through the centre of France, pausing at Paris, Lyons, and Marseilles, then along the Mediterranean seaboard to Genoa, visiting Cannes, Mentone, and Nice. Cannes we found a veritable garden of the Hesperides. Golden fruit of orange and lemon hung on the trees around our hotel, whilst sub-tropical palms and dates, with innumerable lovely flowers, enriched the scene. Never shall we forget the two days spent in Cannes. From Genoa, with its tall palaces, its narrow crowded streets, and its busy harbour, we visited Pisa, that mass of marble loveliness, the matchless group of the Duomo or Cathedral, Baptistery, and Leaning Tower. From Pisa, across the Campagna—a dreary, depressing waste—we reached Rome. It was about ten o'clock when the countless lights of Rome were seen some little time ere we reached it, as the approach is circuitous.

Our feelings may be better imagined than described, for excited emotions found audible utterance at the first sight of the seven-hilled city brilliantly illuminated, not with the lurid lights of a romantic past, but with the brilliance of prosaic gas.

So here we are in Rome ! around whose very name is woven the spell that fascinated our boyish days with a halo of romance and enthusiasm, which maturer years heightened.

Thou art in Rome ! the city that so long
Reigned absolute, the mistress of the world ;
The mighty vision that the prophets saw
And trembled ; that from nothing, from the least,
The loveliest village (what but here and there,
A reed-roofed cabin by a river side ?)
Grew into everything, &c., &c.

—Rogers.

Our stay in the Imperial city being limited to a week, our survey of its ruins, monuments, and art treasures was necessarily very cursory. A series of three days' archaeological lectures by an English expert amongst the actual ruins enabled us to get a more vivid impression of the grandeur and magnificence, otherwise unattainable. The Palatine Hill was our first visit. It was a lovely morning ; a deep blue of a more vivid tint than hitherto seen, flecked with a few light clouds, canopied us ; around, beyond the city walls, stretched the waste Campagna ; beyond which, again,

upon the horizon bounding the view towered the Appennines, the Sabine, and the Alban hills. It was more like a dream than sober reality to be standing upon the remnants of the Palace of the Cæsars. There seemed, as we listened to our lecturer's graphic words, to rise before the mental eye the ghostly forms of temples, palaces, and columns, and to flit before our gaze, with martial tread, the soldiers of the Empire. As we looked upon a ruined wall built by Romulus—Rome's founder—B.C. 750, a solid piece of masonry yet, a new resuscitative life, filled with living forms summoned by memory's magic wand, of stirring scenes some 25 centuries ago, came before us. It is a wondrous story. Wellnigh a hundred generations of mankind have passed down the stream of Time since Romulus built a few rude huts upon this spot, around which envious neighbours settled, causing ill-blood and savage wars. The area covered by Nero's golden house was 62½ acres! Silent yet powerful preachers are these crumbling ruins of the grand divine truth so often forgotten by nations, no less than by men, that "Righteousness alone exalteth a nation."

The Coliseum, this "huge ellipse," next demanded our attention. This stupendous ruin will remain the marvel of all time, as it has done of past generations. Poets have sung of it; other mortals have been awed by its vastness. "Has it indeed been plundered, or but cleared," sung Byron. This gigantic amphitheatre, it is said, was built by captive Jews in the reigns of Titus and Vespasian. It held 90,000 spectators. Were we to attempt to describe a "Roman holiday" within this cliff-like oval arena, we should far exceed our limits. The thoughtful reader will turn to his "Gibbon," than whom none is more eloquent, or to "Childe Harold," so full of undying thoughts.

The Forum—who can think of Rome without its forum?—a household word indeed, which we sometimes think has lost its significance. The Forum! This was the eye of Rome. Amidst its magnificent temples, basilicas, and votive columns the fathers of the people met in calm debate or angry mood. Here have resounded the silvery tones of Virgil, the eloquent, burning words of Cicero, and the persuasive speech of Tully.

Space forbids me describing much else of Imperial Rome, such as the magnificent Arch of Titus, and that unique ruin, dear to all artists, the three columns of the Temple of Castor and Pollux, and many others.

The Pantheon! We dare not omit this ancient temple, now converted into a Catholic shrine. Its very name is a synonym for beauty.

Simple, erect, severe, austere, sublime!
Shrine of all saints, and temple of all gods,
From Jove to Jesus—spared and blessed by time
Looking tranquillity, while falls or nods,
Arch, empire, each thing, round thee, and man plods
His way through thorns to ashes. Glorious dome!
Shalt thou not last? Time's scythe and tyrant's rods
Shiver upon thee—sanctuary and home
Of art and piety—Pantheon, pride of Rome!

The Baths of Caracalla! Next to the Coliseum, the Baths of Caracalla are the most stupendous mass of ruins—more ruinous certainly, but most impressive. When we are told that Rome in her palmy days boasted ten or eleven of such, it should dawn on us conceited Englishmen that sanitation and the laws of hygiene are not a nineteenth century discovery, which one sometimes fancies from our present day sanitary conferences. We recommend to the reader "The Last Days of Pompeii," wherein Lytton graphically pictures the luxurious life of the Romans. They combined baths, gymnasia, and public libraries.

Did space allow we would like to describe other relics, as Trajan's Column, so beautifully detailed by Wordsworth, and many another noteworthy object of old Rome.

We must now take our readers to Florence (as in a single lecture it is impossible to give justice to one city alone, and that city *Rome*). Brilliant sunshine and a faultless blue sky, with a cool temperature, marked the day we journeyed to Florence. We are passing the country of the Etruscans, that strangely interesting antique people, the puzzle of antiquarians; passed Orvieto, with its Papal memories, perched upon an isolated hilltop of volcanic tufa. Then we come to Chiesi, the ancient Clusune, whence Porsenna and his hosts marched to the conquest of Rome.

We will at once take you to the favourite station whence to view "*Firenze la Bella*," as the Italians lovingly call this city of flowers. There, below us, sloping down to the river Arno lies Florence, the beautiful, a most ravishing sight, its coloured marble domes and campaniles pointing heaven-ward, its numerous bridges spanning the serpentine river—truly a glittering jewel in an emerald setting. The distant mountains are softly shrouded with mists, and from the somewhat clouded sky come flashes of glorious sunshine, causing the white villages on the green hill-sides to gleam like gems. Opposite us stands the straggling village of Fiesole—older than Rome itself.

Brooding over the fair city before us are the memories of its eventful past, and to the spirit's eye appear from down the ages the glorified forms of the great and good whose angel voices fill the air with the plaintive notes of a Dante or the love songs of a Petrarch. One figure of chastened aspect and beauty who met a tragic death by martyrdom in the city down below us, ages ago, was the pure-souled Savonarola! The air we breathe on this hilltop seems to quiver with two song-stresses of our land—Elizabeth Barrett Browning and George Eliot.

We stayed several days in Florence and visited its most interesting places as the Uffizi Palace, where are the art treasures of Italy, such as the Venus de Medici, the Apollo Belvidere, marvels of sculpture. Here are some of Titian's chef d'œuvres. Here is the Chapel of the Medici, one blaze of coloured marbles, porphyries, and lapis lazuli; the Pitti Palace, once the residence of the Dukes of Tuscany. Here we saw a genuine portrait of Cromwell, also some marvellous work of that eccentric genius, Benvenuto Cellini. From the Boboli Gardens at the back of this palace we get most entrancing views of this fair city. In the Loggia d'Lanzi are some very fine statues in bronze. Space fails me to tell of Santa Croce, the Italian Westminster Abbey; the Duomo or Cathedral, and Giotto's Campanile. To see the latter is to dream of its loveliness evermore.

From Florence we journeyed over the Appennines to Venice, calling on route at Bologna. This latter place is very quaint, a typical old Italian city with shady arcades along its streets, very grateful in the Italian glare and sunshine. There are two leaning towers here, but very ugly, built of brick, which seen from one point to slope opposite ways. There is a fine University, which drew its thousands in mediæval times.

To describe in as few words as possible the first impression of Venice must conclude our lecture. Long before reaching the city of a hundred islands we saw a streak of lovely indigo, and above it a jagged line of white—these were the Adriatic and the Austrian Tyrol. A mole connects the mainland to Venice, along which the railway runs. As we emerge from the station, we find ourselves at the top of a very wide flight of steps, with easy slope down to the green waters. Here no din of noisy traffic jars upon the ear amidst the poetic scenes that meet the eye as the visitor steps down this flight of steps that lead to the Grand Canal. No dusty clouds from

usual city life obscure the marble palaces which rise, as by an enchanter's wand, from out the still green waters, the rich architecture and beauty of colouring faithfully mirrored in the glassy pavement of these strange waterways. A whole flotilla of gondolas from the various hotels awaits the passengers, and the stalwart and swarthy gondoliers vociferate in loud tones the names of their respective hotels. It is interesting to note the ease and grace displayed by the rowers, and though in places the gondolas are as thick as bees collisions seldom occur.

St. Mark's and its Piazza ! The Noble Square or Piazza of St. Mark is surrounded on three sides by colonnaded stone buildings, which form the Regent Street and the Rue de Rivoli of Venice. Here, sipping their chocolate, may be seen the dandies of all nations. This magnificent open space is 575ft. long by 185ft. wide, one end of which is bounded by the west façade of that unique church, the rapture of artists and the glory of antiquarians—St. Mark's. Vivid as is the impression upon the mind and easy as it is to recall in memory its wondrous appearance, the effort to attempt the description of this wondrous temple utterly fails. There stands this Christian Fane, a blaze of varied colour ! In form a Greek cross, above the intersection and at the other four extremities rise five domes, the central one supreme. Perfectly ineffable in effect is the magnificently elaborate west front, as it presents itself to our first gaze. The emotions then awakened were but intensified by successive survey. What a wealth of coloured marbles and prodigality of style which is called Romanesque Byzantine ! To us it is simply superb at every part. Its cupolas or domes in lovely curves, its innumerable pinnacles, statues, and exquisitely chiselled network of marble arching the five semi-circular mosaic alcoves above the entrances, sharp against the undimmed azure sky, will never be forgotten. To a reverential eye the charm of colour wrought by age, tinging the marble with richer and warmer tints than when the sculptor's wondrous skill, many centuries ago, fashioned these inimitable capitals, is no mean element of one's enjoyment of this the world's noblest shrine of art. We enter, and as our eyes become accustomed to the subdued light which filters in through tintured glass, we are amazed at its indescribable richness of detail. Artists are transcribing, or attempting, to canvas worthy objects.

To sail through the canals beneath the historic Rialto and the tragic Bridge of Sighs, and on the placid bosom of the lagunes threading its hundred islands, is to get impressions which no other city in the world can give. It is a poetic reverie, not prosaic fact.

A celebrated French artist (M. Havarel) gives us the picture of Venice approached by water :—

"Suddenly, above the green water in front of the blue mountains, whose feet are lost in mist, we see her rise. She glitters in the midst of islands that surround her. Her palaces of blue and white seem to float on the Adriatic. She reminds us of a necklace of pearls lying upon a cloth of emerald velvet."

A week spent amidst the indescribable beauties of Lakes Como and Maggiore, and a visit to Milan, with its transcendently lovely white Duomo, concluded our six weeks' unalloyed pleasure of a first visit to this land of the vine, the fig, and the olive—a land, as we said at the start, dearer than most for its tender as well as thrilling memories—a land, thank God, which is rising from its lethargy and putting on new strength, and taking its due place in the European march of progress. Vale ! Vale ! Italia !

BRITISH CENTRAL AFRICA.

By Mr. J. HOWARD REED, Hon. Sec. ("Victorians").

[Addressed to the Members in the Library, on Friday, May 31st, 1895.]

IN the year 1497—four hundred years ago save two—Vasco da Gama rounded the Cape of Good Hope on that eventful voyage which, for the first time, gave to the ships of Europe a direct sea passage to India. Following the east coast of Africa northward, the bold voyager touched at Quilimane and Mozambique, and passed on to Mombasa and Malinda. Obtaining at the last-named place the services of an Arab pilot, he then successfully directed his course eastwards across the Indian Ocean to Calicut.

At that time the Arabs were in possession of the east coast from Sofala to the "Horn of Africa," but within a few years their sway began to wane, and the Portuguese influence gradually became paramount. The colony of Mozambique was founded and has remained a Portuguese possession ever since. The colonists confined their attentions almost wholly to the immediate coast-lands at the mouth of the Zambezi, where they founded trading posts and mission stations. The early missionaries extended their influence along the river itself as far as Zumbo, where ruins of their church may still be seen.

The interior of the Zambezi district remained practically a *terra incognita*, the Portuguese of that day having no accurate knowledge of the geography of the tributary rivers, inland lakes, or other features. Any meagre information they may have possessed was of hearsay character, gathered from the natives themselves, and even for this they were, doubtless, indebted to the Jesuit priests. Some vague reports of a lake, situated in the neighbourhood of a tribe of people known as the Maravi, evidently leaked out, as a lake bearing that name was dotted in on maps of Africa of the beginning, and until after the middle, of the present century, although its shores had, apparently, never been visited by any European.

The first British connection with the portion of Central Africa under review dates from the time of Dr. Livingstone's descent of the Zambezi in the year 1856, at the end of that memorable journey of his, which, for the first time, connected Cape Colony with the Portuguese territory of Angola on the west coast, and that in turn with their long established settlement at Mozambique.

The wonderful discoveries of Livingstone so excited public opinion in England, both philanthropic and commercial, that the British Government of that day determined to do something to open the Zambezi district to both trade and missionary enterprise. Early in 1858 Livingstone was appointed Her Majesty's Consul at Quilimane for the East Coast of Africa to the south of the Zanzibar dominions, and for the independent interior districts, and in addition was appointed to the command of an expedition for the exploration of Eastern and Central Africa. Associated with him on this expedition was Dr. Kirk (now Sir John Kirk), who has since become such a prominent and trusted authority on all African questions.

The well directed efforts of this historic expedition resulted in the exploration of the Zambesi and the Shire rivers, the discovery of lakes Nyasa and Shirwa, and in other little less important geographical work.

In January, 1861, the Universities Mission, under Bishop Mackenzie, was founded in Nyasaland, due largely to the personal influence of Livingstone himself. The first party of missionaries, however, met with serious disaster, the bishop and some of his assistants losing their lives almost at the outset. Bishop Tozer, who succeeded Mackenzie, prudently decided to withdraw from Nyasaland, for a time, and removed the mission to Zanzibar, which has since remained its head-quarters. The Universities Mission again entered the Nyasa district in 1881, a branch being established on the Island of Likoma, in Lake Nyasa, under the direction of the celebrated Bishop Steere. This island has now become the seat of a bishopric. Here, as is well known, our friend and member, Archdeacon Maples, has laboured devotedly and well for a number of years. The members of this society will, I am sure, have noted with pleasure that it is he who has been chosen to become the head of the mission, and the fitting successor of an illustrious line of prelates.*

In 1875, Dr. Stewart, of Lovedale fame, established the Livingstonia Mission, on behalf of the Free Church of Scotland, which has become such a great success under the guidance of the able and devoted Dr. Robert Lawes. The established Church of Scotland founded a flourishing mission at Blantyre. Four other missionary organizations have also been at work in Nyasaland for some time past, including the well known Zambesia Industrial Mission.

The African Lakes Company was founded during the seventies, with the dual object of philanthropy and commerce, and has performed a most useful function for many years.

These various organizations, with an increasing influence for good, have been at work in the Nyasa district from the days of Livingstone right down to the present time. During the whole of the period previous to the proclamation of the British Protectorate, in 1891, they laboured on quite unsupported by the British Government, beyond the fact that this country was represented by a Consul for a considerable portion of the time.

The modern rush of the European Powers for African territory caused the Portuguese to turn their attention to the interior districts behind the Colony of Mozambique. With the view of creating a cross-continental sphere of influence, by the junction of their Colony of Angola in the west with that of Mozambique on the east, they attempted, in a high handed manner, to absorb the whole district where, for more than thirty years, important British interests had been growing up. This attempt was made in face of the fact that the intermediate district had, probably, at no previous time, been trodden, and certainly never explored, by Portuguese travellers, much less occupied by their people; while, on the other hand, British travellers had explored and made known its geographical features, and missionaries and traders of the same nation had, moreover, very efficiently occupied and developed the Shire high-lands and the Nyasa district. The flourishing missions, the well cultivated plantations, and the steamers and other craft on Lake Nyasa and the Zambezi and Shire rivers, all testified to the importance of the British influence which was effectively at work. The pressing of these arrogant claims, and an attempt, later, by Portugal to put them in force by the despatch of an armed expedition to Nyasaland, led to unpleasant negotiations, extending over a period of nearly three years, between the British and Portuguese Governments, considerable strain and friction taking place at times. This, however, happily came to an end early in 1891, a convention being duly drawn up and signed by both Powers.

* While this is in the press we receive sad news of the death of Bishop Maples by drowning, through the capsizing of his boat on Lake Nyasa when on his way to Likoma.—J. H. R.

In May, 1891, the British Government proclaimed a Protectorate over the Nyasa district, which is now officially designated British Central Africa. Mr. H. H. Johnston, C.B., was appointed Her Majesty's Commissioner for the administration of both the Protectorate and of the British South Africa Company's sphere on the north of the Zambesi. In return for this work the Chartered Company agreed to contribute £10,000 per annum to the Imperial funds to cover the cost of administration. This contribution was afterwards increased to £17,500. The Chartered Company have also found money for the measures taken against the Yao slaver Makanjira, and have, in addition, undertaken to construct the telegraph. This arrangement is about to come to an end, and in future Mr. Johnston will confine his work to the Protectorate, while Dr. Jameson will assume the administration of Northern Zambezia on behalf of the South Africa Company. The contribution of £10,000 per annum, however, is to be continued till the end of the present year, after which the cost of administering the Protectorate will fall directly upon the British Government.

In August of last year the report of Mr. Johnston's first three years' administration was issued as a Parliamentary paper. This report is so valuable and instructive, from a commercial and geographical point of view, that I have drawn upon it very largely in the preparation of this paper, feeling sure that the blue-book itself will be seen by comparatively few of our members.

British Central Africa is bounded on the north by the Congo State, the southern shore of Lake Tanganyika, and German East Africa; on the east by the German territory and the Portuguese colony of Mozambique; on the south by the Portuguese sphere, the Zambesi River and by German South-West Africa; and on the west by the Portuguese colony of Angola. This territory has, roughly speaking, an area of 350,000 square miles. The eastern portion of this sphere, that which borders the western shore of Lake Nyasa and the larger portion of both banks of the Shire River, forms the official Protectorate, and is probably not more than one-eighth of the whole. The other and larger portion forms part of the territory reserved to the South Africa Chartered Company, and which they are now commencing to open up and develop. Mr. Johnston's report deals only with the Protectorate itself and the eastern and better known portion of the remainder, an area of about 210,000 square miles.

The country, generally speaking, consists of a rolling upland or plateau of from 3,000 to 6,000 feet above the sea level, reaching in places 7,000 feet, and in a few scattered peaks to close upon 10,000 feet. Mr. Consul Sharpe and Captain Manning are reported to have recently climbed the highest point of the Mlanje Mountains. They find it to be no less than 9,680 feet above the sea level, and suppose it to be the highest point in British Central Africa. The Nyika Plateau, situated on the north-west of Lake Nyasa, also has an altitude of 7,000 feet, and is stated to have an area of about 1,200 square miles, about equal to the County of Gloucester.

Much the larger proportion of the territory falls between the 3,000 and 6,000ft. levels, while the area which falls below 3,000ft. is comparatively small. These temperate plateau lands, we may well believe, must be of incalculable value to the people who reach them after journeying from the low-lying and unhealthy coast lands, where the heat is excessive and fever prevalent. "On the plateau," Mr. Johnston remarks, "above 3,000 feet in altitude, it may be truthfully said that at no season of the year is the heat unbearably oppressive, and for six months out of the twelve the temperature is delightful."

Nearly the whole of the district under review is exceedingly well watered. The average rainfall equals about fifty inches, ranging from thirty-five to seventy-five inches, according to the locality. The highest figures apply to a few favoured districts which have a considerable altitude, while the lowest figures mentioned are

characteristic of small areas only. A district along the banks of the lower portion of the Shire River, more especially on the right bank and reaching to the Zambezi, has a comparatively small rainfall, not apparently exceeding thirty-five inches. Mr. Johnston states that even within the remembrance of the natives the amount of rain at this part has considerably decreased, and their statements to this end are largely borne out by the appearance of the deeply scoured stream-valleys now almost dry. This alteration in the rainfall is thought to be largely due to the destruction of forest trees caused by bush fires in the past, and is only to be remedied,



by the prevention of such, by an organised system of government like that now growing up under British auspices.

A copious rainfall naturally implies the existence of a large number of streamlets, which, rising in the higher parts of the country, flow towards the lower lands, unite to form more or less considerable streams, and then flow onward to feed either the great main rivers—the Congo and the Zambezi—or to empty themselves into the various lakes in the district.

The principal river of British Central Africa is, of course, the Zambezi, which, with its main tributary, the Shire, forms the natural waterway into the heart of the

district. This great river is navigable for light-draught steamers from its mouth to about 100 miles beyond where it receives the waters of the Shire, except during the rainy season when its navigability is extended for some distance further, viz., to just above the Portuguese settlement of Tete. From this point navigation is interrupted by falls and rapids to some forty miles below Zumbo, but from that place the river again becomes navigable to beyond the junction of the Kafue, a distance, roughly, of perhaps 200 miles. Most of the territory along the banks of the Lower Zambezi is under Portuguese dominion, and its waters are, therefore, of more importance to them than to the British, except, of course, for the fact that the river forms the natural highway into the interior. The upper navigable waters, however, beyond Zumbo are wholly in the British sphere, and will probably prove of great value in the further development of the country.

Both the northern tributaries of the Zambezi, the Kafue and the Loangwa, afford considerable navigable water, more especially the last named. The Shire River, however, forming as it does the main artery of the British Protectorate, connecting Lake Nyasa with the Zambezi, is the most important stream in the whole of the British sphere. As is well known, its navigability is broken by the Murchison Falls, but with this exception the river forms an unbroken highway during a considerable portion of the year. The Tshambezi and the Luapula, forming the upper waters of the Congo, also afford considerable stretches of navigable water.

British Central Africa is also a land of great lakes, and these vast bodies of fresh water will undoubtedly play a large part in the future of the district. Lake Tanganyika, the southern end of which falls in the British sphere, with its length of 400 miles—equal to the distance from London to Aberdeen—forms a connecting link between Nyasaland and the districts of both Germany and the Congo State to the east and west, and brings its shore line of at least 1,000 miles within easy touch. It also affords a continuous navigable waterway to within some 150 miles of the great Victoria Nyanza which in turn has the British Protectorate of Uganda on its northern shores. Mr. Scott-Elliot, who has been recently exploring the district, says this figure can be reduced to sixty miles by using the Kagera River, a western tributary of Lake Victoria.

Lake Nyasa, 360 miles long and from thirteen to forty miles broad, also affords an enormous navigable area, and renders an extensive shore-line available. Lake Mweru, sixty-eight by twenty-four miles, and Lake Bangweolo, with an estimated area of 1,672 square miles, also fall within the British sphere. Several salt lakes, of which Mweru and Shirwa, or Chilwa, are the most important, also exist. According to Mr. Alfred Sharpe, Deputy Commissioner, the natives about Lake Mweru very ingeniously extract the salt for domestic use. They gather the impregnated earth from the shores of the lake and mix it with water. This they strain by means of funnels made of cleverly woven grass, collecting the salt water beneath. This is then evaporated, cakes of tolerably pure salt being left behind. The late Captain Cameron described a very similar process practised by some of the Tanganyika and Congo tribes with whom he came in contact.

From an agricultural point of view, the future prospects of British Central Africa are very promising, and already considerable progress has been made in this field. The natural flora of the district includes many valuable products, and the many varieties introduced by Europeans give promise of much future success. In certain districts, considerable timber forests exist, and these afford much valuable material for building purposes, although many kinds are of very hard character. A kind of cedar, known as the *Widdringtonia*, has been discovered growing in "splendid forests" on the Mlanje plateau. These trees often reach no less than 130ft. in height, and

the timber from them has already been largely used for building purposes, the whole of the Residency and adjacent buildings at Zomba having been re-roofed with it. Many articles of furniture have also been made from this wood, it being easy to work and capable of receiving a high polish. Ebony of good quality exists in considerable abundance.

Various kinds of palms are found. The cocoa-nut, which appears to have been introduced by either the Arabs or black Portuguese, is found along the banks of the Zambezi and Lower Shire, and flourishes well. Mr. Johnston believes this palm could be successfully introduced "anywhere along river banks, or near great sheets of water like Lake Nyasa." Oil palms and a wild date are also found. Enormous and beautiful raphia palms grow in some of the valleys, and the Commissioner speaks of a forest of these which he saw, as one of the grandest sights he has ever seen in the vegetable world. The gigantic fronds of these palms, he says, are often from thirty to forty feet long, and their midribs are used to make rafters, ladders, and poles for various purposes. They are very light, but at the same time strong and durable. Bamboos, from three to four inches in diameter, and similar to the Indian variety, are abundant between the altitudes of 3,000 and 5,000ft. The natives, however, so far, appear to make little or no use of these, as is done by the Asiatic peoples.

Various india-rubber plants and oil seeds are indigenous to the district, and promise large commercial developments in the future. Tobacco is also grown, but so far seems to have been almost wholly consumed locally. Valuable fodder grass grows on the high-lands above 5,000 feet, while many other minor indigenous vegetable products, of more or less value, might be mentioned.

Native fruits are numerous, but, from a European point of view, are reported to be of small value. Various kinds of fruits have been introduced into Nyasaland, and many of these have been a decided success. Pine apples succeed well; oranges, lemons, and limes flourish at various settlements throughout the country, from the Shire district to some of the Arab stations on the shores of Lake Tanganyika. These have been introduced both recently by Europeans and previously by Arabs. The vine has not succeeded very well, while stone fruits have been a failure. Apple trees grow well, but so far as fruit is concerned, have not, hitherto, been a success except in one garden at Blantyre. Figs at first were unsatisfactory, but now seem to give better promise. Guavas and strawberries do well, the latter being pronounced "a distinct success." All members of the potato family are remarkably satisfactory, while tomatoes are equally successful. Various kinds of introduced flowers flourish well.

European vegetables of most kinds are a great success, celery being a special exception. Barley, oats, and wheat succeed, especially an Indian variety of the latter, introduced into Africa by the Arabs. Rice of excellent quality is grown on the banks of the Upper Shire, and on the shores of Nyasa, and Mr. Johnston remarks: "There is no reason why the shores of Lake Nyasa should not produce rice enough to feed the whole world."

Without doubt the, hitherto, most remarkable development of British Central Africa, and one which scarcely has its parallel anywhere else, is the extraordinary result which has followed the introduction of coffee planting in the Shire high-lands. This industry was introduced some years ago by Mr. John Buchanan, C.M.G., British Vice-Consul. The late Professor Balfour, of Edinburgh, gave three plants to the Blantyre mission, which were duly planted and tended under Mr. Buchanan's direction. One only of the three survived, but from this single successful plant others were propagated, which have now increased to large plantations, containing, Mr. Johnston says, "probably two million trees." The coffee produced has taken a high place in the London market and commands a good price. The export of coffee from Nyasaland

in 1889 was about five tons, but in 1893 this figure had risen to forty-five tons, and is now, says the Commissioner, "likely to increase by leaps and bounds, inasmuch as in the next two or three years some 1,500,000 coffee plants will come into bearing." This statement is fully borne out by Mr. Sharpe, the Acting Commissioner. He has recently reported that the export of coffee in 1894 amounted to close upon seventy-four tons, nearly double that of 1893, and he states that the crop of 1895 "can now be definitely expected to fully double that of 1894."

There appear to be some small, but special difficulties in the way of completely successful coffee-growing in these new plantations, which have not as yet been mastered, but no disease has, so far, shown itself, and there seem to be hopes that the minor difficulties may be overcome as experience progresses. The climate and rainfall appear to be exactly suitable; there is abundance of land, with a splendid virgin soil waiting to be brought under cultivation; and labour, moreover, is both plentiful and cheap. These facts, coupled with the wonderful development that has followed the introduction of only one tree, provide abundant hope, if not complete certainty, for the future success of coffee in Nyasaland. It is interesting to know that the original plant which has produced such wonderful results still lives. We may well believe that this historic tree will be carefully guarded and cared for by the settlers in our new Colony. May it live to a hoary old age!

Cotton reported to be of "good quality" is grown in scattered places by the natives, and Mr. Johnston appears to think its cultivation was at one time "almost universal," as was likewise the manufacture of native cloth. These industries have been practically destroyed by the introduction of European calico, which, however, we are told, is much inferior to that of native make, both in quality and pattern. This statement, which, by the way, is not peculiar to Nyasaland, is one which should be taken to heart by the manufacturers of Lancashire.

In addition to the vegetable products already referred to, various oil seeds, maize, millet, sweet potatoes, pumpkins, peas, beans, sugar-canes, plantains, bananas, and many others, too numerous to mention, might be added.

Turning to minerals, we may note that gold has been discovered in more than one place in the country. Copper is reported from at least two places in the western districts,—the Katanga country, which lies just beyond, is, of course, well known as producing large quantities of this metal. Graphite has been found in the neighbourhood of the Lower Shire, and garnets are met with in some of the stream courses. The new African Protectorate is already known to be rich in iron ores; the natives, indeed, both smelt and work this metal to a considerable extent. Coal also has been discovered on the north-western shores of Lake Nyasa.

The mineral resources of a new country are generally the last to be discovered and developed. Such, at any rate, has been the case in America and the older British Colonies. It is impossible to say what may be the probable mineral prospects for this Protectorate in the future but the great gold country to the south of the Zambesi suggests the possibility of similar, though perhaps not equal, riches to the north of the river, while the later experiences of other countries encourage much hope. Quite recently it has been reported that a discovery has been made of a rich ground containing gold, coal, copper, and diamonds in the vicinity of the Zambezi. Mr. Sharpe also reports extensive deposits of coal of good quality as having been lately discovered near the Shire River.

The animal products of the Protectorate are many and valuable. The whole of the district under survey has been often pronounced by experienced travellers as one of the most prolific hunting countries in the world, and this view is very fully endorsed by Mr. Johnston's report. Among the fauna of the district the elephant of course takes

the first place in point of commercial value. During 1893 more than nineteen tons of ivory of a value of £18,252, reckoned at 8s. 6d. per pound, passed through the Custom Houses of the Protectorate; but the Commissioner is of opinion that this quantity, probably, does not represent more than one-half of what was actually procured in and exported from, the district, as the trading Arabs still continue to evade the organised British authorities. This leakage will, of course, lessen as the Government organisation becomes more complete, and the exports are compelled to pass through the proper channels. Mr. Johnston believes that "provided the Brussels Act is enforced, and guns and gunpowder kept from the natives, especially from the Arabs, and Europeans only are allowed to shoot elephants by taking out a licence, the elephant is likely to exist with us for all time, and yet to supply a sufficiency of ivory for the trade." He thinks that the native methods of killing elephants, by pit-falls and traps, cause nothing like the indiscriminate waste of elephant life which follows the use of gunpowder and bullets.

On the question of taming the African elephant for draught purposes, the Commissioner speaks with caution, and even with doubt, remarking: "I think the disposition of the African elephant is too capricious and naturally savage to constitute him in any way a reliable beast of burden." The last word has, however, by no means been said on this question, and it is, to say the least, doubtful if any really earnest attempt has as yet been made to solve this problem, at any rate, on any sufficiently large scale. African elephants have been tamed in the past; we can hardly believe that those beasts used so largely by the Carthaginians were any other than the African variety; the well known Jumbo, was, I believe, a native of the "Dark Continent;" and I think I am right in saying that other African specimens are to be found in various zoological collections throughout the world. Captain Lugard in his recent remarkable work, "The Rise of our East African Empire," deals at length with this question and advocates the introduction of elephant catchers and tamers from India, so that *kheddah* experiments on a large scale may be made in Africa.

The hippopotamus, Mr. Johnston considers, might be destroyed with advantage, as this animal is a great danger to the boats and canoes which navigate the various rivers, and, moreover, does immense damage to the crops of all kinds in the neighbourhood of the rivers' banks. The animal will be difficult to exterminate, he says, as it multiplies much more rapidly than the elephant, and has natural preserves, into which it is impossible for the hunter to follow. The hide and tusks of this animal have a considerable commercial value.

The rhinoceros is, also, found throughout the district, and is regarded more tenderly by the Commissioner, who questions whether it is worth while to allow such an interesting animal to be destroyed "for the sake of the horn."

In addition to these, great numbers of giraffes, zebras, buffaloes, and many kinds of antelopes also roam the district. Such great wealth of animal life gives much promise of a large trade in hides and other animal products. Lions and leopards are also found in considerable numbers.

Horses and cattle thrive well in certain portions of the Protectorate. The great difficulty, however, is the old story of the tsetse fly. Wherever this pest exists no domestic animals can live, except they be either goats or donkeys, and in some places even these poor beasts fall victims to the ravages of the insect. Fortunately the fly is not general throughout the country, but appears in certain scattered places only. By passing horses through these affected districts by night the insect is often avoided, or by transporting the animals by water, where possible, they escape unscathed, because it seems the tsetse fly never crosses a river nor appears on its banks. In spite, however, of the present existence of this great scourge, it is a

hopeful fact that the fly does not take kindly to human beings, and keeps at a respectful distance from man's habitation. This is, doubtless, due to the absence of game, and it will, in consequence, retreat further and further from the settled districts as civilisation extends. Horses are also liable to a peculiar form of lung disease, but this can be guarded against by proper precautions being taken.

Mr. Johnston refers in his report to the great cattle plague, which affected not only the native domestic cattle, but also swept off countless thousands of such wild animals as buffaloes and zebras. All who have read Captain Lugard's book will remember the reference he makes to the ravages of this terrible visitation, and his description of its career of desolation throughout the length and breadth of Central Africa.

The Commissioner suggests that something might be done in the way of taming and domesticating the zebra, and remarks that this feat has been much more widely accomplished in Cape Colony than is generally known in this country. Captain Lugard is at one with Mr. Johnston on this point, and in his work deals at some length with the question. He says, "The elephant would be invaluable in many ways, but his utility as an agent for the development of the country (Africa) cannot be compared with that of the domesticated zebra."

Mr. Johnston is also of opinion that the buffalo might be tamed and trained for draught purposes if caught young, while certain of the antelope tribe might be domesticated and bred for food. The African goat is of much value in the Protectorate; it gives very little trouble, affords a fair supply of milk for months at a time, and gives good eatable meat nearly equal to mutton. The African sheep, a fat tailed variety, is found in the district, and the merino sheep has recently been introduced.

There are also found in Nyasaland large numbers of guinea-fowl, and these are easily tamed. Various kinds of wild ducks and geese frequent the lakes and rivers, and Mr. Johnston thinks some varieties of these might be domesticated. Pigeons, brought into the country by the Portuguese and Arabs, thrive well. Muscovy ducks and turkeys have been introduced, and are fairly successful, but a few European fowls which have reached Zomba, although they have laid well and hatched out large numbers of young, have so far been anything but encouraging.

White ants, the tsetse fly, and various other objectionable forms of insect life (some of which are not absent even in England under certain conditions) are the usual insect pests of the country. In 1893 a more terrible visitant, the locust, appeared in portions of the Protectorate. This insect appears to have ravaged and practically ruined the native crops of a vast extent of country, covering portions of the Congo State, German East Africa, as well as some parts of the British sphere. Reports of the destruction have reached us, through our newspapers, from each of the districts mentioned. In the season of 1894 this pest again appeared in even larger numbers, and great distress among the natives has been the result. It will be remembered that Archdeacon Maples told us recently that before leaving Likoma he had been purchasing large quantities of rice to provide for the people about the mission in case of a famine arising. Speaking before the Royal Geographical Society he said that when he left Nyasaland, a few months ago, "the dead locusts were, on some parts of the lake shores, like sea-weed thrown up after a storm, and the stench was so great that it was impossible even for natives to pass by at certain places." In some parts of Africa the natives use locusts for food, and Mr. Theodore Bent states that they reminded him somewhat of shrimps.

The population of British Central Africa is comparatively scanty, being, according to Mr. Johnston, barely twelve to the square mile in that portion of the territory with

which his report deals," or a total of not more than 2,500,000 for some 210,000 square miles. These people are of various tribes, but all of the well-known Bantu type. Some of them are strong, warlike, and unruly, while others are exactly the reverse. As is always the case in Africa, and indeed in all savage countries, the stronger and more arrogant tribes prey upon their weaker neighbours. Probably no part of Africa can show a more complete picture, than can Nyasaland, of continual intertribal warfare, barbarous oppression, and sacrifice of human life, which has taken place in the past, due to "man's inhumanity to man."

This fact alone, quite apart from the larger question of the suppression of the slave traffic, and irrespective of any trade development or commercial advantage, would in itself justify the introduction of British influence into Central Africa. As has been abundantly shown in India, and other places, the planting of the British Flag is the harbinger of better things. The strong hand of Britannia places a check upon the oppressive cruelties of overbearing tribes, while, at the same time, it fosters and protects weaker peoples. Contentment and civilization follow as a consequence and grow apace. Difficulties, of course, occasionally arise which necessitate strong action and even the shedding of blood, as was the case recently in Matabeleland. Regrettable as such stern necessities undoubtedly are, they are, however, after all, veritable kindness itself compared with the state of things which would exist were the native races left to themselves, or rather to the tender mercies of one another.

No more terrible state of bloodshed and rapine can well be imagined than that of Africa left to herself. Accounts of such horror, however, rarely reach our newspapers, so that civilized communities, as a whole, neither grasp nor understand the facts. On the other hand, any trouble in which European forces happen to be engaged is fully reported in the daily press. Partially informed people, and those who view matters from the narrowest of standpoints, rush into print or make speeches in Parliament and cry shame without possessing any real grasp of the question or taking the trouble to examine it in all its bearings. The operations of a skilful surgeon who sheds blood in order to save life are merciful. When the expert boldly cuts into the flesh, causing intense pain in so doing, but at the same time effecting a cure, he confers a benefit upon his patient. In like manner a merciful purpose is served by that authority, which, for the benefit of an uncivilized people, crushes a barbarous and bloodthirsty native tyrant; or breaks up a desolating military caste, whose only business is to prey upon and slaughter weaker peoples. Those who raise their hands in holy horror, in so doing often place themselves on a parallel with those hysterical persons who, at the sight of the surgeon's knife, lose their heads and either scream or faint. It is surely better that a bloodthirsty despot should be crushed, than that a people should be decimated or destroyed. It is better that a tribe should be punished, than that a whole district should be laid waste. It is absolutely necessary to get a sufficiently broad grasp of these matters. A proper view cannot be obtained from the limited confines of the valley of imperfect knowledge, nor from the enclosed area of prejudice. In order that our mental outlook may be wide and unimpeded it is essential that we should patiently climb the hill of fact and get high upon the mountain of impartiality.

Returning to Nyasaland, we find that a considerable district in the south is peopled by a tribe known as the Mañanja. They are described as a peaceful and industrious race, good agriculturists, and clever iron-workers. They are not a warlike people, and have consequently suffered much from the predatory habits of the neighbouring tribes, and from the slaving of the early Portuguese settlers. Their country has been overrun from time to time between 1820 and 1870 by Zulu hordes, and since the middle of this century they have also been invaded by the dreaded Yaos from the east of Nyasa.

The Yaos come from a district in the neighbourhood of the Rovuma and Lujenda rivers. The invasion of their own country, and other causes, compelled some of these people to move westward and settle on the eastern shores of Lake Nyasa and in the high-lands about the Shire River. They had already learned slave-trading from the East Coast Arabs, with whom they had come in contact, and on reaching the country of the peaceful Mañanja commenced to raid those people and sell them into slavery. Mr. Johnston thinks it probable that the Yaos would have conquered the whole of the southern district had it not been for the coming of the English and for the Makololo settlers whom Livingstone placed on the banks of the Lower Shire. All the fighting that has taken place for the suppression of slavery by the British administration has been with Yao tribes, who are confirmed slavers of the worst type. These people, as is well known, have recently invaded in force the district bordering upon Blantyre, but have fortunately been repulsed and driven back by Mr. Sharpe and Captain Manning.

The Yao is described as a "wily, skulking robber," rather than a brave enemy. Where, however, these tribesmen can be brought into touch with Europeans, and taught to understand something better than the slave trade, there seems to be a promising future for them as useful citizens. Already two of the missions have made considerable headway among them, and numbers are now regularly working as printers, etc., in the production of the *British Central Africa Gazette*, and other local papers, as well as at carpentering and other trades. A writer in the *Nyasa News* of November, 1893, speaks in very hopeful terms of the Yaos, and combats the idea that they are either treacherous, cowardly, or lazy.

To the west of the lake are found the Angoni, who are described as a mixture of Mañanja and Zulu. These people are a warlike race, but have a great respect and friendship for the white settlers. A few years ago they were the terror of the district. Captain Lugard says of them: "These Angoni were the terror and curse of all this country. Swooping down at night in their fantastic garb of war, with the unearthly yells, grunts, and groans with which they accompany their attack, they would fall upon villages and loot everything—sheep, goats, fowls, and crops. Sometimes they would carry off captives of war. At other times they seem possessed with a lust for carnage only, and kill man, woman, and child without distinction, leaving not a living soul behind on the scene of their brutal attack. These awful bursts of savage slaughter, combined with their character for invincible courage, the appalling sounds they utter, and the garb they wear in war, have struck such terror into the surrounding tribes that resistance is rarely offered to an Angoni raid. When the dread cry is raised that the Angoni are coming, a blind panic seizes the helpless villagers, and each thinks only of flight and concealment, unless, as more often happens, the surprise is complete by night, and there is no time for escape."

Such, however, has been the influence of the white settlers upon these people, that the Commissioner is now able to describe them as a "splendid people," who "may be regarded as the backbone of British Central Africa." They already take service very largely as labourers in the plantations, and have even entered the ranks of the Protectorate police force. For "honesty and steady hard work" they appear to be very reliable. These are the tribesmen spoken of by Joseph Thomson as having, a few years ago, drenched the lake shores and plateaux of Nyasaland with blood, but as having now, practically, beaten their spears into pruning-hooks by becoming workers in the plantations, which they have helped the white settlers to render a success.

Further to the west, or between Lakes Bangweolo, Mweru, Tanganyika, and Nyasa, are found the Awemba. In the days of Livingstone these people do not seem

to have been considered very terrible, but since then they have learned slave-raiding from the Arabs. They have proved themselves very apt scholars, and now, with the guns and gunpowder which they obtain from their teachers, over-run and devastate the whole of the plateau between the four lakes.

At the middle of the immediate western shores of Lake Nyasa are found the Atonga. These people we are told were probably saved from annihilation by the advent of the Scotch missionaries at Bandawe. Previously, they were raided by a powerful Angoni tribe, who seemed bent on their extermination. The mission staff at Bandawe entered into friendly relations with the Angoni, and, as a result, the Atonga were spared. The whites are now abundantly repaid for their kind offices, for these people, above all others in the district, have made the whitemen's interests their own. They offer themselves by hundreds as workers in the Shire plantations, travelling a long distance from the lake shores to Blantyre for this purpose. They also perform a useful function as porters, and as efficient members of the native police force. Various other tribes are, of course, found in the British sphere, but those mentioned are the principal peoples in the Protectorate.

In spite of the present scanty population of Nyasaland, there is every reason to believe that the district was at one time "densely populated by races superior in culture to those at present existing." This is proved by the traces of old villages and the fragments of pottery which are found. The depopulation has been principally brought about by the devastation caused by the slave trade. The Arabs introduced this traffic hundreds of years ago, but it would seem to be only since the coming of the Portuguese and the introduction of guns and gunpowder that native tribes have been taught to raid and sell one another. Other European nations, including ourselves, were mixed up in this horrible trade for a long period, so that it is only fair to say the blame does not by any means entirely rest upon Portuguese shoulders.

The depopulation has resulted in large portions of the country becoming a complete wilderness, over-run by animal life, which in turn has led to the re-appearance of the tsetse fly, which has, of course, made colonisation in these places difficult, and development consequently slow.

The slave trade is still carried on by the black Portuguese, the Arabs, and several of the native tribes, the Yaos more especially. The British administration, as is well known, has been doing its best since the establishment of the Protectorate to stamp out the traffic. It is estimated by the Commissioner that, previous to government efforts, some 2,500 slaves were exported annually from the Nyasa district. This number, he thinks has probably been reduced to less than 1,000. It is to be hoped that before many more years have passed the whole traffic, at least in this district, may be completely destroyed.

Mr. Johnston and his assistants have, since 1891, succeeded in setting free more than 860 slaves who were being transported by their captors. This work, has, of course, been largely helped by the gun-boats placed on Lake Nyasa by the British Government.

Forts have been established at various places, for the purpose of preventing slave raiding, and for the protection of the natives. Numbers of the people now gather about these forts for the sake of the security which the presence of the European Resident and his Sikh soldiers afford. In order that the natives shall contribute something towards the expense of this protection the Commissioner has instituted a hut-tax of three shillings per annum, which is, he says, paid willingly by the people on whom it is levied.

Mr. Johnston has been taken to task by a recent writer on Nyasaland, who complains that the Commissioner "levied" what are described as "exorbitant taxes."

The missionaries and planters, we are told in the blue-book, also made representations that the tax of six shillings per annum, which was at first proposed, was too high, and it was in consequence of this that the matter was reconsidered and the tax fixed at three shillings. It is interesting to note that the *Nyasa News*, which as is well known is a journal edited and printed in Nyasaland at one of the mission stations, in reviewing the above quoted book, says: "The taxes certainly should not be exorbitant, and at present are not." It might be mentioned that several other severe criticisms of Mr. Johnston's administration, contained in the same work, are also very ably contested by the *Nyasa News* reviewer. It is certainly gratifying to find that residents of long standing in the Colony are willing to come forward so gallantly in the defence of the official representative of the British Government.

Referring to the Arabs, Mr. Johnston says: "In the interior of Africa they are adventurers, and ordinarily adventurers of the worst type," and he has come to the conclusion that their "presence . . . is incompatible with the introduction of European civilization," and that "sooner or later the Arabs must go from Central Africa."

He believes, however, that "the salvation of Central Africa will be found in the introduction of the Indian trader and agriculturist. The yellow man," he says, "is required in this country as much as the black and the white, so that he may occupy a middle place, and fill up the gap between the two extremes." Whatever may be the real value of this opinion, time alone can prove; but it certainly carries great weight as coming from such an authority as Mr. Johnston is acknowledged to be. Already some numbers of Banyans are settling down in the Shire district, taking up land for plantation purposes, and starting stores. Indian cooks, carpenters, and other artisans have been imported, while the Government troops are from Sikh regiments. These people will certainly play a most useful part in the commercial development of the country, and, in the future, the British districts of both Central and East Africa may become most valuable as colonies for the overflow population of British India.

In July, 1891, the total white population in the Protectorate was fifty-seven. In March, 1894, this number had increased to 237. With eleven exceptions all these persons were British subjects, sixty-nine of them being English, while no less than 130 were Scotch. The death-rate during 1893-4, among the whites, was about six per cent, as against two per cent, which is the average at home.*

The forms of illness common to an African climate afflict the European residents more or less in Nyasaland, but, Mr. Johnston says, "the only malady to be really dreaded is black-water fever." British Central Africa, as a whole, cannot be described as healthy for Europeans, but it is certainly better than other tropical districts in Africa. On some of the higher portions of the country, where the altitude reaches over 5,000 feet, the Commissioner thinks that "Europeans might retain good health, and even rear children without much, if any, deterioration of race."

One of the first necessities of a new colony is safe and easy communications. British Central Africa is fortunate in this particular in having the splendid waterway of the Zambesi and Shire rivers, and Lake Nyasa. These, except for the Murchison Falls, afford direct water communication from the Indian Ocean into the heart of the district. At the end of 1893 there were plying on these waters no less than fourteen British steamers (including the gunboats) besides two steam tugs at the Chinde mouth of the Zambesi. There were also eighty British tugs and lighters, and quite a fleet of smaller craft. Mr. Sharpe says these have now considerably increased.

* This is not of course a fair comparison, as the white settlers in Nyasaland must be looked upon as picked lives. On the other hand the risks in a new country, especially in the Tropics, are of a very special character,—J. H. R.

A good wagon road has been made from the Lower Shire to Blantyre at a cost of £2,000, and also a road from Blantyre to Zomba.* A carriage road from Zomba to the Upper Shire is not at present practicable, owing to the presence of the tsetse fly. The colonists are, however, now looking forward to the time when a railway will be constructed past the falls connecting the Lower with the Upper Shire. Preliminary steps have already been taken to this end, and it is to be hoped that not many years will elapse before such a railway is a reality. A company was also formed for the construction of a line direct to Lake Nyasa, from Pemba Bay on the East Coast, through Portuguese territory.† Railways are perhaps the greatest civilising agencies of modern times, and must certainly become an important feature in the development of Central Africa.

For the year 1891 the value of the imports into British Central Africa was about £33,000, which figure grew to £49,142 in 1893, an increase of £16,142. The exports for 1891, so far as can be ascertained, reached about £6,965, and increased in 1893 to £22,139, being an increase in two years of £15,174. Taking these figures together, and adding an allowance for products carried out of the country by Arabs, who so far have avoided the British Custom Houses, Mr. Johnston brings up the total of the year's trade to £72,781‡. Mr. Sharpe's recent report states that the trade for 1894 has increased over the previous year by about £12,200, having reached a total of £85,000.

A postal service for letters, book packets, newspapers, and parcels, has been established throughout the British district, and residents can now communicate with one another from the Shire province to the Tanganyika plateau at the rate of one penny per half-ounce. The rate from England and foreign countries is sixpence per half-ounce. In 1893 no less than 132,912 letters are estimated to have been carried, and an equal number of newspapers, besides book packets and parcels.

The telegraph so boldly conceived and energetically pushed forward by Mr. Cecil Rhodes, and intended to connect South Africa with the northern districts, and ultimately with Egypt itself, has already reached the Protectorate. Before the end of last year Blantyre was reported to be connected with Tete, the Zambesi had been spanned, and the wire carried to Mazoe, only some 150 miles from Salisbury, the capital of Mashonaland. When Mr. Rhodes was in England a few months ago, he is reported to have placed orders for material for a further 650 miles, which will carry the connection as far north as Ujiji on Tanganyika. This great work on behalf of civilization has been financed throughout by the South Africa Chartered Company.

Mr. Johnston's administration has been supported by an armed force, consisting of three European officers and 200 Sikhs of the Indian Army, forty Zanzibaris, forty Arabs, sixty-nine Makua, besides a varying number of Negro irregulars, principally from the local tribes.

The moral and educational development of the Protectorate is, of course, so far, almost wholly in the hands of the devoted members of the various missionary organisations which are at work in the country, and who have played such a prominent part in the development of this part of Africa. The value of their disinterested work has been incalculable. They have carried noble example, purity of life, educational advantage, and medical skill (to say nothing of their spiritual and religious influence

* This work has been carried out by Captain Sclater, of the Royal Engineers. This officer has now undertaken, on behalf of the British Government, the task of organising the transport system and of the improvement of the roads between Mombasa and the Uganda Protectorate.—J. H. R.

† This scheme is at present in abeyance.—J. H. R.

‡ Adding about £16,000 as the value of the goods imported by the Administration, and about £6,000 for those imported by the Navy. Mr. Johnston increases this figure to a grand total of £94,000.

and teaching) to the native populations, and by so doing have started a brilliant light, which shall, as time passes, more and more illuminate this hitherto dark portion of the great "Dark Continent."

The Universities Mission, whose headquarters are on the Island of Likoma, have some 500 scholars in their schools, and are training a number of boys to become useful citizens as printers, carpenters, and other tradesmen. A newspaper, *The Nyasa News*, before referred to, is published by this Mission, the type being set up by the natives of their own training.

The Church of Scotland Mission have their headquarters at Blantyre, which, of course, takes its name from the Scottish village, the birthplace of Livingstone. This establishment also publishes a monthly paper, *Life and Work in British Central Africa*. They have some 600 boys in their school. A most important branch of their work has been that of the medical staff. Large numbers of natives have by this means had the advantage of surgical and medical treatment, the results of which, to them, have been little less than miraculous. The European residents have also reaped much benefit from this organization.

The Free Church of Scotland Mission now have their head quarters at Bandawe, on the west coast of Nyasa, although originally they settled at the south end of the lake, naming their station Livingstonia. Mr. Johnston says that in 1890 he calculated they had some 1,200 scholars in their schools. They have performed a most useful work, notably, as was mentioned earlier, by the influence they were able to establish over the Angoni tribe, which virtually saved the Atongo people from annihilation.

The London Missionary Society have stations on Lake Tanganyika and on the plateau to the south. They also educate between 400 and 500 children.

In addition to the purely missionary, medical, and educational work the missions have carried on, their various gifted members have produced among them quite a library of valuable and useful works, such as vocabularies, dictionaries, and other important volumes.

Such, in brief, is the history of the development which has taken place in British Central Africa. The progress and prospects of one of Her Majesty's youngest colonies are truly encouraging.

The "Dark Continent" has waited long for strong and civilising hands to hold and guide her. Missionaries, explorers, traders, and lastly the British Government have put their hands to the plough, we may well believe never now to be turned back. The challenge of Livingstone has been accepted, and a fitting answer has been given to the historic words he uttered: "I have opened the door; I leave it to you to see that no man closes it after me."

NEW BOOK.

THE NADIRIAN. Vol. I. 1894. Edwards & Co. Ltd., Brisbane.

THIS is the first number of a Queensland venture. It is peculiar. There are two interesting papers in it—one on the Zulu War (with two maps), by an eye-witness, and an illustrated paper on Killarney, Queensland; also an appreciative paper on Waterfalls by Arthur Galton; photographic pictures of children, and verses.

A FEW NOTES ON LAURENT'S MAP OF MANCHESTER OF
1793.

By Mr. C. ROEDER.

LAURENT's map has been so prominently before the Manchester public, and so often popularly referred to and re-copied, only to mention Lewis's republished "Directory of Manchester" for 1788, and the volumes of the Lancashire and Cheshire Antiquarian Society, that I think it will be of some certain interest to show how it originated, and what value or merits, as a faithful representation of Manchester, as it appeared between 1791-1793, has to be assigned to this survey. We have to retrace our steps a little to show the inter-relation of this map to Green's lovely and painstaking survey which ranged over six years, from 1787-1793. Green announced on the 15th May, 1787 (see *Harrop's Mercury*) his project of publishing a plan of the town to be drawn from an actual survey, and invited subscription thereto, giving minute details how he intended to proceed in laying down his plan. A little later, on the 26th June, 1787 (see *Mercury*), a plan of the town "being an actual survey, taken by the late Hugh Oldham, and finished in a modern and elegant stile," was offered for three consecutive months for sale by T. Oldham, a relation of the former, but it appears no buyer was coming forward. It was in December, 1791, that we find Green announcing in the *Mercury* (see No. 2,114, 13th December)—"Finding it industriously circulated that he has entirely given up his intention of completing his survey, considers himself under the obligation of informing his subscribers that so far from relinquishing it, the plan is three-fourths finished, and that he intends laying aside all his other occupations to appropriate the ensuing half year from Christmas to Midsummer solely to that work, about which time, as part of it will very early in the spring be put into the hands of able engravers, he hopes to complete it." He further proceeds: "From a plan lately begun by another person who wished to assist Mr. Green, he hopes he shall not be injured in the public opinion, as the difference between a plan made from actual survey, with accurate instruments and conducted upon principles true in theory (which will be explained to every scientific inquirer), and one made by striding is too palpable to escape observation."

Mrs. Isabella Banks (see *City News*, 17th Oct., 1885) remarks respecting Laurent's map: "That it was simply a map issued immediately after the Act for paving, cleaning, lighting, and improving the streets of Manchester" had been obtained. "It was a map drawn up, no doubt by authority, to lay down the lines of suggested improvements," &c. That Act, I find (see *Mercury*, 6th December, 1791), was sent up too late for the last session of Parliament, "therefore a Town's Meeting will be held on Monday, 12th December, 1791, in order to reconsider said Bill, and to make such alterations therein as shall, at such meeting, be thought proper, when and where all Persons interested in the welfare of the said town are requested to attend." This new Act was passed on 6th August, 1792. Now the person alluded to by Green under 13th December, 1791, was no other than Laurent, and it is consequently patent that he could not have had any commission from the Leet Court and the Commissioners, as the first Bill was already sent up before he came to Manchester. Green was in evidence with his plan from 1786, and the authorities

would certainly have had recourse to him or other local surveyors for the preparation of a skeleton map to go along with the Bill. Therefore we have to dismiss Mrs. Banks' suggestion. On the 29th October, 1793 (see *Mercury*), we find "Mr. Laurent respectfully acquaints his subscribers to the plan of Manchester and Salford, to which is added in compartment from actual survey, a map of the country round Manchester, a plan of the road from Manchester to London, and a map of the town of Manchester, taken about the year 1650, that it will speedily be published, proofs of which, in a very forward state, engraved by Mr. John Carey, London, may be seen at Mr. Harrop's, and Mr. Thompson's, bookseller, Manchester, where subscriptions to the same is *continued* to be received, and at the same time Laurent begs leave to add his grateful acknowledgment for the liberal patronage he has *already* received. Laurent's stay in Manchester being very short from the necessity of his returning to London, his object at present for visiting Manchester being solely to *correct* the engraving upon the spot, subscribers who are desirous of having this plan mounted, or printed upon sattin, will be so good as speedily as possible to signify to Mr. Harrop, or Mr. Thompson, the manner in which they would have their plans fitted up."

On 22nd October, 1793 (see *Mercury*, No. 2,210), Green "respectfully informs his subscribers and the Public at large that his survey will be ready for their inspection in a few weeks. It may not be improper to observe that his survey was begun in the year 1787, and occupied more than half the author's time until the end of 1791, since which it has been almost uninterruptedly attended to to the present moment. To the consequent heavy expenses, fatigue, and *extreme anxiety* annexed to the undertaking, Mr. Green can hardly presume to hope for a general attention, but trusts that a sight of his performance, with an account of the manner in which it has been carried on and completed, will induce in some degree that countenance and support which he flatters himself he shall justly merit. This plan, which is engraved on nine sheets, was advanced some time ago from one guinea to one guinea and a half."

Laurent published his plan December 9, 1793, in a hurried, incomplete state of work, and styles himself "geographer." The plan adds, "showing also the different allotments of land proposed to be built on, as communicated to the surveyor by the respective proprietors, by C. Laurent, Engineer." On the first plan (of which afterwards two separate re-issues were published) something like 90 names of streets, houses, and courts were left out, which he afterwards no doubt leisurely copied from Green's map.

On 25th March, 1794 (see *Mercury*), Green announces that proof impressions short of about 500 words may be seen at Messrs. Clarke and Banks'. "The number of copies subscribed for amounts to 431, but it is feared that death and *other circumstances* will considerably reduce that number. As it is the author's intention to delay as little as possible the publication of his plan, it will begin to be delivered, in the order of subscription, as soon as 600 copies are subscribed for. As all the additional words are now engraved and the printing in great forwardness, it is respectfully and earnestly requested that those ladies and gentlemen who have not yet, but do intend to honour this work with their patronage will be as early as possible in giving their names." John Stockdale, the printer and publisher of "A Description of the Country from 30 to 40 Miles round Manchester, by J. Aitkin, M.D.," makes the following striking remark in the opening part of that book: "The approbation which the plan of Manchester and Salford, by Mr. Laurent, has met with, induced the publishers to purchase the plates for the benefit of those of his subscribers who are not already in possession of their performance." Now follows this

remarkable passage : " *It was very extraordinary that a foreigner without knowledge of the language, or previous acquaintance with the country, should be able by his eye alone, without the assistance of any instrument (as was verified by the public testimony of the surveyors and architects of Manchester), during the most rigorous season of the year, to survey in less than two months two towns for some miles in circumference, with all their intricate communications !* "

We can now quite understand poor Green's anxiety and sympathetic appeals to the public and the warning he gave them, and why afterwards he entirely relinquished his profession as a surveyor and turned his back on Manchester to give himself entirely up to his darling pursuits of sketching, drawing, etching and painting in the Lake district. A less strong and patient man would have succumbed under the blow of his misfortunes ; his map was financially an utter failure, and left him poor and out of pocket by the vile, dishonest interloper, as C. Laurent, a Frenchman by birth, was. I think that Laurent was employed by Stockdale for engraving the maps which accompanied his popular works on travels and geography, and when the project of publishing Aitkin's " *Description of the Country round Manchester* " came on he sent Laurent probably to Manchester to collect or obtain material for a local map and plans. It appears then he first approached Green to that effect, who refused his " *assistance* . " As Green had already, as we find, finished the map itself by the time Laurent came here in Dec., 1791, he must have obtained a view or inspection of Green's map by some means or other. There lived with Green at that time, as I see from the *Mercury*, a certain " *Anthony Felix Cizis, A.M., a gentleman, who is a native of France, who gave lessons in French, his lodgings with Mr. Green's, No. 2, Brazenose Street.* "

Laurent knew thus perfectly well in what form and shape Green had drawn his map ; he therefore, to suit his purpose, differentiated his own plan as to size and orientation, and, with a view to produce a cheaper and more handy map, got it up in a way to catch and engage public favour, in which he certainly fully succeeded. I do believe that he contrived to get hold, also, of Oldham's old plan, which was offered for sale in *Harrop's Mercury*, and of which nothing further was ever heard. But he most certainly must have availed himself of R. Casson and J. Berry's earlier maps of Manchester of which Harrop, as I have shown elsewhere, acquired the copper-plate from which he produced, in course, a more modern reprint, of which now no copy, however, is in existence, as far as I know. From these earlier maps he undoubtedly obtained also the plan of 1650, and other things. He was, also, largely assisted by Harrop, and thus easily introduced to the notice of the Manchester public and would obtain direct help from both architects, proprietors, and others. Under Harrop's powerful wing and influence he thus had things easy without much apprehension of any suspicion as to his would-be original survey, for which, as a make-believe, he ostentatiously strided and perambulated the town with field book and compass in hand. Harrop was Stockdale's agent for Manchester, while Green's sellers were Clarke and Banks ; it was, therefore, Harrop's interest to back up Laurent's exertions as much as possible. We thus see that Green was a victim of fatal circumstances, but while Laurent's imposture and cunning will remain a standing reproof, I trust that this short exposition of matters may help to distinguish more clearly in the future two productions so entirely opposite to each other ; and if there be a question of quoting authoritative evidence of Manchester, as it appeared in the transition between 1787 and 1793, that Laurent's attempt, for honest work and conception, should never be spoken of in the same breath. It is regrettable to think that Laurent, in so peculiar and strange a manner, should have crossed the path and labours of so eminent a Manchester man as William Green.

THE PROPOSED NILE DAM.

By H. T. CROOK, C.E.

[Addressed to the Society in the Library, 1895.]

EGYPT, as the probable birthplace of civilization, with its long and fascinating history its innumerable monuments of "generations that have passed away and empires that have mouldered from the face of the earth;" its peculiar climate and physical conditions, and its present anomalous political position presents more problems of varied interest than any other equal sized portion of surface of the world.

As a consequence of these peculiar conditions, physical and political, amidst the vestiges of an ancient civilization, any proposition affecting the government or administration of the country receives such notice, and is examined and criticised (not always with sufficient knowledge) in a spirit such as would seem ridiculous or impertinent if exercised in regard to the affairs of any other country.

Especially is this the case with regard to the proposed works for improving the irrigation of the country. There is the political difficulty of dual control of the finances which prevents those actually responsible for the administration and welfare of the country having a free hand to raise whatever capital may be required for great works; there is the æsthetic difficulty of constructing vast hydraulic works in a valley literally strewn with ancient monuments and historic remains.

But the controversy which has arisen has not been altogether useless. Many who never heard of Philæ have by the outcry made upon the threatened submergence of that island and its temple been made aware that Egypt is a land with a history; whilst others have learnt something of the physical peculiarities of the country, and how much its prosperity depends upon the intelligent direction and control of the great powers of nature. Had the importance of the latter fact been more generally understood there would have been fewer of those charges of wanton vandalism which have been so freely hurled at those responsible for the well-being of Egypt and its people.

The Society having received from the Egyptian Government a copy of the reports and plans made by the Public Works Department, it was thought by the Council that a short review of the irrigation problem, and a statement of the nature of the works proposed, would be of interest at the present time.

To properly understand the problem with which we have to deal it is necessary in the first place to recall the principal geographical facts of the situation.

Egypt is what Herodotus called it, "The gift of the Nile;" and although political Egypt is a large country, the real Egypt—the productive and habitable part—does not extend further than the area within reach of the waters of the Nile.

As a geographical expression Egypt with its present south frontier at Wadi Halfa embraces some 393,000 square miles, or nearly $3\frac{1}{4}$ times the area of the British Isles, but the real Egypt—the cultivated and cultivatable area—does not much exceed 8,000 square miles, or little more than the area of Wales, but the soil of this area, the alluvial deposit of the Nile, is of the richest character; and if it receives its need of water will produce two or three crops in the year, thus rendering Egypt the most fertile country in the world.

But the climate being practically rainless this extreme fertility is absolutely dependent on the management of the waters of the Nile. This is a point which has been overlooked by some of those who have participated in the recent controversy. It has sometimes been assumed that the Nile does its work of fertilizing the land without the intervention of human agency, the truth being, on the contrary, that "the value of every field, and the title of every landowner require for their maintenance, an efficient management of the river." The misapprehension arises from the use of the words flood and inundation in reference to the annual rise in the waters of the river. An uncontrolled flood or inundation is as disastrous in Egypt as in any other country. Flood protection works have therefore from the earliest times formed



an essential part of the river regulation. The Pharaohs understood that the welfare of Egypt depended on the mastery of the Nile.

It is necessary to realise what a colossal undertaking is implied in the "mastery of the Nile," and how essential to the perfection and maintenance of that mastery is a stable and intelligent Government.

The cultivated portion of Egypt is generally divided into Upper and Lower Egypt—Lower Egypt being the Delta to the North of Cairo, and Upper Egypt the narrow strips of land forming the floor of the Nile valley from Cairo to Assuan, a distance of 500 miles.

The latter is again divided in some of the reports of the irrigation department into Middle and Upper Egypt—Middle Egypt from Cairo to Assiut, and Upper Egypt

from Assiut to the First Cataract at Assuan. Above that again to the present southern frontier at Wadi Halfa is Nubia. For the 200 miles from Wadi Halfa down to the Silsila gate the river flows in a confined rocky channel, the walls of which only here and there have been cut away by the action of the water, sufficiently to admit of patches of alluvial land forming between them and the margins of the river.

The area of cultivatable land on this stretch of the stream is therefore insignificant, a point to be kept in mind when considering sites for reservoirs.

It is impossible within the limits of a short address to deal with all the details of the management and distribution of water in a gigantic system of irrigation, such as prevails in Egypt. An outline of the problem with which the Irrigation Department has to deal, and of the solution which the engineers responsible to the Government of Egypt have proposed must suffice.

Two systems of irrigation have from early times been practised, namely—basin irrigation and perennial irrigation ; the latter sometimes called artificial irrigation.

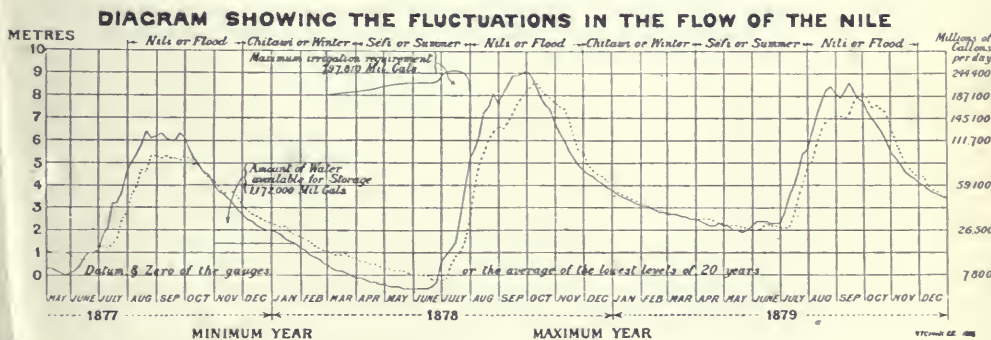
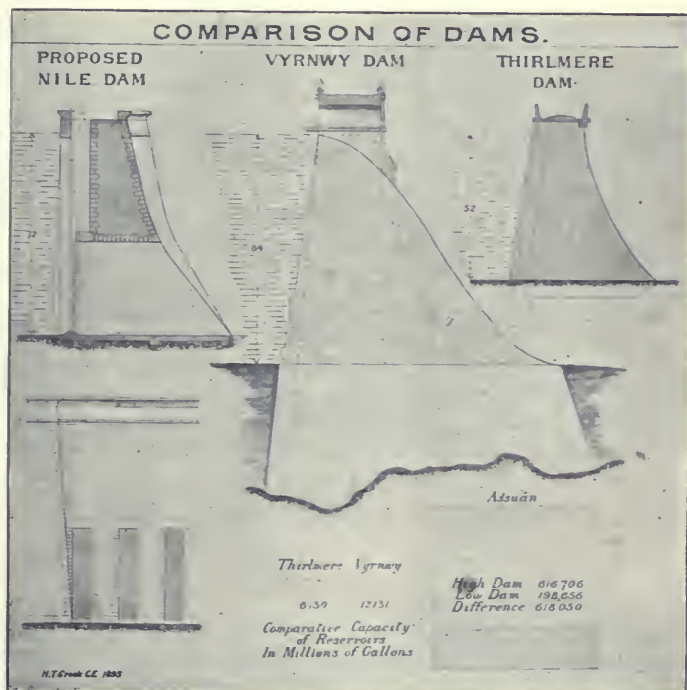
In the first, or basin irrigation, the land is divided by banks or dykes into large plots of 12 to 70 square miles area, something of the nature of large mill "lodges," to which in August and September the waters of the Nile when in high flood and loaded with the rich mud derived from the Abyssinian mountains are admitted. After a month or six weeks, when the river has fallen sufficiently low, the water is drained off, leaving behind its sediment "upon which the crop of wheat, flax, or beans is sown without ploughing in November and reaped in March."

It is obvious that under this system "dearth or foison" depends, as Shakespere said, upon the height to which "Nilus swells." If the river in flood does not attain to an average height, some of the more elevated lands will be left dry, or inadequately flooded, and consequently for that reason unproductive. During the summer a second crop is obtained from much of the basin lands by sinking wells down to the level of saturation in the subsoil, from which water is raised by shadoofs and other appliances. If the level to which the Nile rises is below the ordinary, the extent of this second crop is also materially affected.

The second system is that of perennial, sometimes called artificial, irrigation, where the water is distributed by a network of canals and channels continuously throughout the year.

Roughly speaking it may be said that the basin system is the system of Upper Egypt, whilst in the Delta the perennial, or continuous, system is all but universal. It is by the perennial system that the land can be made to yield most ; but at the same time it is a system which requires capable scientific management, and the construction and maintenance of an elaborate system of works, many of them of a gigantic and costly nature.

It can only be successfully carried on in a country which has a settled Government. Before the fall of Ishmail the Delta was rapidly deteriorating. Under the perennial system most water is required for irrigation when the Nile is at the lowest and least capable of supplying it. Owing to the failure of the barrages and the silting up of the canals the supply to the more northerly parts of the Delta failed, whilst in flood they were swamped by the water fended off from the lands situated at the apex of the Delta. It is by the successful reconstruction of the barrages and attention to regulation of the supply canals and the drainage of the lower lands that British skill and enterprise have brought back prosperity to the Delta and restored the finances of Egypt. Proposals for the further development of the system, made by the men who have brought about this great and beneficent transformation must therefore claim most attentive consideration. The main idea in these proposals is to provide a sufficient supply of water for the perennial irrigation of the whole of Egypt.





Upper and Middle Egypt has a cultivated area of about 2,300,000 acres English, of which about 470,000 are provided with perennial irrigation and the remainder irrigated by flood only.

| | | |
|--|-----|------------------------|
| The average area of the Summer crop is | ... | 290,000 acres. |
| " " Flood crop | ... | 550,000 " |
| " " Winter crop | ... | 2,080,000 " |
| | | <hr/> 2,920,000 acres. |

That is, only about 25 per cent. of the area bears a double crop. The cultivated area of Lower Egypt is about 2,840,000 acres English, the whole area being provided with perennial or semi-perennial irrigation.

| | | |
|-----------------|-----|------------------------|
| The Summer crop | ... | 1,040,000 acres. |
| " Flood " | ... | 1,248,000 " |
| " Winter " | ... | 2,184,000 " |
| | | <hr/> 4,472,000 acres. |

Thus about 70 per cent. of the area yields a double crop.

Taking the two together we have an area of more than 5,000,000 acres to be irrigated, to which must be added land which is capable of being reclaimed, estimated to be about 500,000 acres. Converting these figures into square miles we have for—

| | | |
|--------------|-----|---------------------------|
| Upper Egypt] | ... | 3,591 |
| Lower Egypt | ... | 4,443 |
| Reclaimable | ... | 800 |
| | | <hr/> 8,834 square miles. |

Supposing all this land to be put under perennial irrigation, Mr. Willcocks, the Director of Reservoirs, states that the value of the annual yield would be increased from £32,315,000 E.* to £38,540,000 E., or a net gain to the country of £6,225,000 E. per annum.

Mr. Garston, the Under-Secretary of State Public Works Department, puts the gain to State by sale of lands, increased yield of taxation on the augmented value of lands, increased revenue from State lands, &c., at £850,000 E. per annum, equivalent, at 5 per cent. per annum, to a capital of £17,000,000 E. The figures are based on actual experience, and are worked out in great detail in two appendices to the Report by Major Brown and Mr. Forster. The prospect of much less satisfactory results than these would justify a very large expenditure on works to control the river. In scarcely any part of the world could so magnificent and certain a return be looked for by a Government anxious to benefit the people.

The next points considered are the quantity of water required to insure the perennial irrigation of this area—how it can be obtained, and where it is to be stored.

In the report are tables showing the amount of water required throughout the year for irrigation and the amount available in the river at its lowest and in years of minimum supply. A comparison of these two quantities shows the amount of the deficiency and the time of its occurrence. The deficiency will, of course, be greatest in a year of minimum rise in the Nile. A reservoir must be capable of storing and making good at the right time this maximum deficiency.

* £1 Egyptian = £1 0s. 6d. English.

To illustrate the problem in a graphic manner I have prepared a diagram showing the fluctuations of the Nile in a minimum and maximum year, and the daily discharge of water for any given depth on the gauges.

In considering the irrigation problem, together with that of the management of the Nile, the quantities of water with which we have to deal are so enormous that it is difficult to choose a unit in which to express them. If a large unit such as cubic metres is adopted, one with which English people are not familiar, the significance of the comparison with other hydraulic works is apt to be not fully realised.

I have thought it better therefore to stick to the million gallons as a unit with which those of us who take an interest in municipal affairs are familiar in connection with water supply. Taking the water consumption of Manchester at 26 million gallons per day, Thirlmere when full holds more than 300 days' supply. The maximum deficiency in the supply required for the perennial irrigation of Egypt is 797,000 million gallons, or about 98 Thirlmeres. We must therefore have a reservoir at least 100 times the capacity of Thirlmere, and it must be satisfactorily shown that it can be constructed with safety and that there is water to fill it with. There is plenty of water in the Nile, the discharge of which in a maximum flood is 244,000 million gallons per day or thirty Thirlmeres, or the flood discharge would fill Thirlmere in 48 minutes.

During the greater part of the flood season the Nile is so heavily charged with sediment that if it were all arrested and deposited it would fill up a reservoir, even to the enormous capacity of that proposed, in about 70 years.

Towards the end of October, as the flood is falling, the water becomes comparatively clear and gains in clearness during the following months.

As the fall of the Nile is only 1 in 11,000 or 5" in the mile, it is obvious that a dam of even moderate height will form a reservoir of immense length. One reservoir of large capacity is under such circumstances incomparably cheaper than two or three, and every foot of increase in height of the dam will store an enormous additional amount of water at very little cost. The lower part of a dam is the expensive part. Another important element is the selection of the site. A comparison of the proposed dam at Assuan with Vyrnwy and Thirlmere dams show that it would have a height intermediate between the two, the depth of water behind the dam being 72ft. as against 84 at Vyrnwy and 52 at Thirlmere. Of two dams holding up the same height of water the cost of one may be many times that of the other. A good foundation is essential, and if it can only be obtained at a considerable depth below the original surface great extra cost will be incurred in most expensive work before a single foot of water can be dammed up.

These considerations led to the proposal for a single dam for the Nile Reservoir. In the dam sluices are to be placed with a sufficient waterway to pass the maximum flood. During the "Nili," or flood season, these sluice gates would all be raised, the flood passing as it does now, except that in extreme flood there would be a slight heading up. At the end of October, when the water has become clear the sluices would be lowered and the water impounded. The river must not be entirely stopped; sufficient water must be allowed to pass down the river to keep it at a proper level for navigation.

By calculating the discharge of the Nile after the end of October in a minimum year, and deducting the amount required for navigation, we have the amount which is available for storage. This amount is 1,172,000 million gallons, or 140 Thirlmeres. It is clear, therefore, that the water required to fill the reservoir can easily be obtained in the most unfavourable year. An exhaustive examination of the river within the frontier for sites suitable for a dam to retain the quantity of water required was made, with the result that practically they were found to be only four in number, viz.—

Assuan, Kalabsha, Gebel-Silsila, and Philæ, of which Assuan alone would hold the full amount of water needed, and best fulfils all the conditions necessary to a good site which have just been referred to. A dam on this site would be about a mile in length and would cost about £2,000,000. The reference to the Technical Commission has resulted in so strong a recommendation of the Assuan site from an engineering point of view—that is, safety, economy, and efficiency—that it is hardly necessary to enter into the comparison of the various sites, though it may be mentioned that a dam at Silsila would submerge the temple known as Kom Ombo and the town of Assuan.

The rocky barrier of the First Cataract upon which the dam would stand is situated just below the island on which the ruins of Philæ stand. The section of the dam shown on the cartoon is that originally proposed; by it during two months of the year the island of Philæ would have been completely submerged. On the lower part of the cartoon is a diagram showing the comparative capacity of the reservoir as originally proposed, and as last proposed by the Ministry of Public Works. The difference is therefore the price in terms of water which Egypt is asked to pay for the sentiment of Philæ.

A description of the effect of the most recent form of the project was given in the *Times* on the 29th December, from which it may be gathered that even now it will scarcely be acceptable to archaeology and sentiment. "It now appears that, for rather less than two months of every year, the Temple of Isis will stand reflected in the surface of the lake, washing to within a very few feet of the base of its walls. To the south the colonnade will be dry, except, perhaps, at its extreme end, where the earliest of the Philæ builders, the magician hecatombs, erected a shrine to Hathor. Here a thin film of water will soak among the fallen blocks and over the top of the quay wall. North of the Temple, most of the labyrinth of brick constructions will be submerged, and nothing will show conspicuously on the eastern side except the shafts, abaci, and architraves of Pharaoh's Bed submerged nearly to the top of the inter-columnar screen."

Something should be said of the Wadi Rayan project so inseparably associated with the name of Mr. Cope Whitehouse. Some years ago it is probable, had that project been investigated in detail, it would have met with more support than now. The success which has been obtained in the Delta in perennial irrigation has, as we have seen, led to the conception of much more ambitious designs. The Wadi Rayan does not offer a complete solution of the irrigation problem. It would be an assistance to Lower Egypt, but the cost in comparison with the complete solution of the irrigation problem offered by the Assuan Reservoir is prohibitive. The Rayan project would cost £2,000,000; the original Assuan project was estimated to cost about the same sum; but then it would store nearly four times the quantity of water.

Parts of the Wadi Rayan are below the sea level, and it would seem that it might be possible to irrigate the higher portion of the district, using the depression as a basin to receive the drainage. In this way another addition might be made to the cultivatable area of Egypt.

The fortunes of Egypt depend on the control of the Nile. A real mastery of the Nile can never be obtained until the Soudan is again opened to the equatorial lakes. Every step which Egypt makes in progress under the tutelage of England brings the day nearer when this great question will have to be faced. Let us hope that we shall face it in a proper spirit, and find compensation for the humiliation and disgrace we suffered when the curtain fell on the sacrifice of Gordon and the triumph of savagery at Khartoum.

THE MAPPING OF AFRICA.

COMMUNICATED BY GENERAL E. F. CHAPMAN.*

INTRODUCTION.

IN April of last year I wrote to the President of the Royal Geographical Society on the subject of the "Mapping of Africa." Copies of my letter were sent to all those whom I believed to be interested in the question, and the many encouraging replies that I have received have emboldened me to accept the invitation of the International Geographical Congress to address you to-day on the subject.

During the last fifteen years a great change has occurred in the relations between Europe and Africa. While formerly matters connected with African Geography were of interest to but a comparatively few individuals, who regarded them chiefly from a scientific point of view, at the present day far the greater part of the continent has been placed within the spheres of influence of European Powers, who are devoting much thought, labour, and money to the commercial development of their African possessions and to the introduction of a higher civilisation among the inhabitants.

Again, the necessity for finding elbow room for our surplus populations has directed the attention of Europe towards Africa as a possible field for colonisation, with the result that many of the older colonies are expanding rapidly, and experiments are being made in many parts with a view to ascertaining whether there are other regions fit for Europeans to live in. One result of these changed conditions is that the class of map which used formerly to suffice fails to meet the requirements of the present day. Before the partition of Africa occurred the question whether a certain place in the interior of Africa lay east or west of a certain meridian was a matter of purely academic interest; now, uncertainty as to the position of such a place may easily bring about a grave misunderstanding and even armed conflict between the local representatives of two States, and thus lead to most regrettable political complications in Europe.

Again, where European colonists settle they bring with them their national customs and wants—a civilised government has to be established with all its requirements; farms taken up have to be surveyed and registered; roads and railroads are made; and in short, the innumerable occasions arise which render reliable topographical maps indispensable to a civilised people. From the variety of conditions that prevail in different parts of such a vast continent it is obviously impossible to prescribe one class of map as universally suitable. I would, therefore, suggest the following classification:—

1. In countries already colonised or being colonised by Europeans maps are required approaching in accuracy to the European standard. It may not be neces-

* This valuable communication was read to the Society and met with approval. The substance of the paper was submitted to the International Geographical Congress in London, and was approved by that body—as an appending further correspondence is appended.

sary to show the same amount of minute detail, and it may even be advisable, for the sake of economy, to omit, for the present, unproductive areas. These are matters on which the local authorities can best judge, but the point I urge is that all the detailed surveys that are made should be connected with a triangulation of such a character that they can be laid down with sufficient accuracy to prevent the possibility of any subsequent legal disputes as to boundaries and other rights.

2. The partition of Africa has given rise to numerous boundary agreements between different States. Many of these boundaries exist at present only in the shape of meridians or parallels, and will probably prove to be absolutely unworkable as they stand. For the proper settlement of such boundaries we require surveys accurately located as to latitude and longitude, and with the topography carefully executed on a scale that may vary perhaps between 1 : 100,000 to 1 : 500,000.

3. Lastly, we have those portions of Protectorates and spheres of influence which are admittedly unsuitable for European colonists. Here we require fairly accurate and detailed maps to aid in the proper development of the country, by showing the most suitable lines for roads and railways that may be made and to serve all the purposes of administration. Absolute accuracy of position is perhaps not so essential as in the boundary maps, and smaller scales will suffice, at any rate in some districts, but fairly good relative accuracy is obligatory.

Let us now glance at what has been already done. The general maps already published that are based on reliable triangulation are few. They comprise Algeria and part of Tunis, small portions of Egypt, parts of Eritrea, parts of the Cape Colony, and part of British Bechuanaland. And here I should like to take the opportunity of expressing my sense of the debt of gratitude which all interested in the geography of Africa owe to the French and Italian nations for the valuable surveys they have made in Algeria, Tunis, and Eritrea, and of the example they have set in this respect to other European colonising nations. In Natal and in much of the Cape Colony outside the area of which the maps have been already published, much triangulation has been carried out, and many detail surveys have been made of farms and estates, but the results have not yet been made accessible in the shape of published maps. We may, however, be confident that as long as Dr. Gill remains in his present position at Capetown no effort will be spared to turn to account the good work that has already been done, and to add to it in the future. For the rest of the continent, speaking generally, we are dependent on the results of astronomical observations, numerous in some parts and scanty in others, and of every degree of reliability, and on the route sketches made by Government officials and independent travellers.

Adhering to the classification suggested and confining our attention for the moment to British possessions (as there are no doubt gentlemen present more qualified than I am to state what has been and what can be done in the possessions of Continental Powers), we find that the countries coming under Class 1 as requiring topographical maps based upon a reliable triangulation are the Cape Colony, Natal, Bechuanaland, and part at any rate of the British South African Company's territory, part of British Central Africa, and perhaps part of British East Africa. In these countries, as we have seen, much has been done, but much more remains to do. It has been pointed out to me by my friend General J. T. Walker, C.B., R.E., that in my letter to the President of the Royal Geographical Society I made frequent use of the word "geodetic" with regard to the triangulation of these countries, thus implying that I considered that their main triangulations should necessarily be of the highest class. I therefore take this opportunity of thanking General Walker for the correction and of disclaiming any intention of expressing an opinion on such a point. Though I am far from wishing to run counter to any proposals for geodetic work, the

interests I advocate to-day are topographical, not geodetical, and all I urge is that the triangulation should be good enough to satisfy all the topographical and administrative requirements of the case.

It may have appeared to some that in the same letter I laid especial stress on the advisability of completing triangulation without insisting sufficiently on the necessity for topographical surveys. The reason of this was that I understand that in South Africa generally an immense amount of ground in the shape of farms owned by individuals and of the estates of the large land and mining companies has been already mapped, and that these surveys only require to be connected by triangulation to form the basis of a reliable topographical map. If this were done the Government of the different States would no doubt in time see the advantage of instituting a topographical survey, to fill in the gaps, which would not, I should imagine, prove a very costly business. I am convinced that the completion of topographical surveys in the countries I have named, or at any rate in the portions already colonised or likely to be colonised, will result in much eventual saving to the States and will assist materially in their development. I wish, therefore, to urge the importance of completing those already in progress, and of commencing others where they are still wanting.

To turn now to Class II., the boundaries of those portions of Africa not likely to be colonised. Many of these, as I mentioned above, are at present defined by meridians or parallels and others by straight lines drawn on the map between the two distant points, one of which at any rate is usually far from well fixed in latitude and longitude. That it will eventually be necessary to survey these, no one can doubt; and as the uncertainty at present existing is always a possible source of dispute between contiguous States, it is to be hoped that it may soon be found practicable to demarcate most of them. How such surveys are to be carried out must depend on so many circumstances that it is impossible to put forward definite proposals; but I think that, wherever it is possible, they should be based upon, at least, a rapid triangulation, which, though not perhaps attaining the accuracy of a triangulation for a regular topographical survey, will, in a favourable country, give results falling but little short of it and quite sufficient for the demarcation of most of the boundaries in Africa. By a rapid triangulation, I mean one executed with a small theodolite, perhaps without any previous reconnaissance of the ground, and without, in many cases, erecting beforehand artificial marks to observe to. The observations would be computed on the spot, and the topography would be based on the results and carried out *pari passu* with the triangulation. Such a method has already been used for the demarcation of the boundary between British and German East Africa from the sea to Mount Kilimanjaro, and for the map made for the negotiations between Great Britain and Portugal relative to the boundary in the neighbourhood of Manika in South East Africa.

Lastly, we have the countries unsuitable for colonisation, forming by far the greater portion of the continent, and presenting every variety of characteristic. In many of these the denseness of the vegetation, or the want of water, taken in conjunction with the small economic value of the land, renders a regular topographical survey a work whose cost would be out of all proportion to the return. Such countries must be treated on their merits. The more valuable portions, of which maps are required for administrative purposes, should be mapped when possible by plane-tableing, based upon a minor triangulation, but for by far the greater part of such regions we shall have to trust for further topographical information to the exertions of private individuals or of Government officials who can devote their spare time to mapping. This brings me now to a point that I regard as of great importance. Nothing is further from my intention than to detract from the credit due to in-

dependent explorers and to Government officers travelling as explorers in Africa, for their exertions in aid of geographical science.

It would be a pleasant task for me to refer in detail to the excellent exploration work that has been done by the French in the Eastern Sudan and French Congo, the Germans in Togoland, the Kameruns, South-West Africa and East Africa, the Italians in North-East Africa, the Belgians in the vast territories of the Congo Free States, and the Portuguese in South-East Africa, to say nothing of what has been done by my countrymen in various parts. Time, however, forbids more than a passing reference to many famous explorers of all nations, whose names are too familiar to all interested in Africa for it to be necessary for me to mention them. It is to them far rather than to State surveys that we owe our present improved knowledge of the interior of Africa. But still a time must come, and, in my opinion, it has already arrived as regards many parts of Africa, when even great exertions on the part of the traveller may add but little to our knowledge of the country he traverses; and I wish to point out how by modifying his method and setting himself a less ambitious and perhaps less attractive task, he may greatly increase the value of his work. Every one who has had much to do with compiling maps will, I think, agree with me as to the difficulty of constructing a general map, even on a scale as small as 1 : 1,000,000, from a number of route traverses, however carefully executed.

Where the region is a blank on our maps, a route traverse is, of course, always welcome, but where several routes have been already laid down, each succeeding one adds but little to the topography, even though that may be still very incomplete. In fact, a traveller has to go a long way now-a-days, in order to strike a new route of any interest.

The consequence is that our knowledge of the topography of a district has a tendency to advance fairly rapidly up to a certain point, where the main roads and the villages on them, the crossings of rivers, etc., are fairly well laid down, but at this point it is inclined to stick, and the general drainage system and the configuration of the hills, if it is a hilly district, are left to the fancy of the compiler.

To meet this difficulty I would suggest that the Geographical Societies interested in Africa should consider whether they could not encourage residents and travellers in Africa to sketch areas rather than routes.

Here the field for action is almost unlimited. Every resident official or trader in unsurveyed Africa has at his very door the opportunity of doing good work by making a careful map of his district, extending as far as his circumstances permit; while the traveller can find useful work in almost any part he may wish to visit, even if it has been scored all over by the routes of previous travellers.

Supposing now that certain areas are surveyed in this manner by any agency, State-aided or private, in regions not covered by triangulation, the proper location of them in latitude and longitude becomes of the first importance. To effect this we require a framework of really accurately fixed points all over the unsurveyed portions of Africa. The facilities that such a framework would afford for the accurate compilation of the work that has been already done by explorers, and of the much that remains to be done, can I think hardly be disputed. The formation of such a framework is a task that affords scope for all classes, Government officials, Geographical Societies and private individuals.

How the points are to be fixed is impossible to lay down, but I may call attention to the great facilities afforded by the lines of telegraph now being rapidly extended over parts of Africa, and destined, at no very remote date, to spread over nearly the whole continent. By utilising these in conjunction with observations for latitude a vast number of places can be accurately fixed, which places will serve as dating points

for minor triangulations and for fixing other places in various ways. It is possible, too, that the method of obtaining longitude by means of photographs of the moon and stars may prove a most valuable auxiliary, and supersede with advantage, when practicable, the usual methods of obtaining absolute longitude.

In work of this nature there will be much scope for mutual assistance between the different nations that claim spheres of influence in Africa, and the results attained will depend largely upon the facilities afforded to observers by the other nations whose territories lie contiguous to the districts in which they are working.

Before, however, concerting measures for the fixing of new points we must take stock of what material we have already existing. In the different parts of Africa thousands of astronomical observations have been taken, and the results of most of these have seen the light in some shape or other. Many have been used in the compilation of maps without any mention being made of them. In other cases the latitudes and longitudes obtained by observation are entered on the maps, but no explanation is given of the manner in which they have been obtained. Sometimes a list of a traveller's results appears in some Geographical magazine without any indication even of what instruments he had used; while at other times—and this especially the case with the more recent German and Austrian explorers—the observations are referred to some competent mathematician, who publishes an exhaustive critique of them, giving full information as to the method he has employed in the computations, and his opinion as to the probable degree of accuracy of the results. Too much credit cannot be given to the Geographical Societies and publications which adopt this method of dealing with astronomical work, and I consider that the German geographers deserve the thanks of the public for their enlightened action in this direction.

The extreme difficulty that there is in arriving at a decided opinion as to the value of many of the published latitudes and longitudes has been particularly impressed upon me by an inspection of the list of astronomically fixed positions compiled in the Topographical Section of the War Office, and I am sure that the International Geographical Congress would earn the gratitude of all map-makers in the present, and greatly facilitate the formation of the framework of fixed points in the future, if it could take steps to collect and publish a list of all the astronomically fixed points in unsurveyed Africa, giving the following information: The observer's name, approximate date, exact place of observation, instruments used and method employed, datum points for relative longitudes, and the opinion of some competent person as to the probable degree of accuracy of the results.

It is probable that such information with regard to most of the observations taken is still in existence either in Government offices, in the archives of Geographical Societies, or in the possession of private individuals, and it is only by the hearty co-operation of all concerned that we can hope to obtain a satisfactory result. Once the ground has been cleared by the publication of such a list of positions it remains for those interested in the mapping of Africa to take care that such information is invariably made accessible to the public as regards all observations that are taken in the future, so that the Geographical world may know what degree of reliance to place upon them.

I cannot end without thanking the writers of the numerous sympathetic expressions of concurrence with my letter to the President of the Royal Geographical Society which I have received. They serve to convince me that there is a general feeling in favour of doing something in the direction I have indicated in this imperfect sketch. I trust that the eminent Geographers I see around me will be able to evolve some method of carrying out the end we all, I believe, have at heart, and I promise my hearty co-operation in any plan which may meet with general approval.

LIST OF DELEGATES TO THE SIXTH INTERNATIONAL GEOGRAPHICAL CONGRESS WHO SIGNED THE RESOLUTION REGARDING GENERAL CHAPMAN'S PAPER ON THE "MAPPING OF AFRICA."

| | |
|--|--------------|
| Herr Professor Dr. A. Penck | Austria. |
| Le Lieutenant-Général Wauwermans | Belgium. |
| A. de Smidt, Esq. | Cape Colony. |
| Lieutenant-General E. F. Chapman | } England. |
| Major the Honourable M. Talbot | |
| Le Colonel Bassot | } France. |
| M. Schrader | |
| Dr. Freiherr von Danckelman | } Germany. |
| Herr Ernst Vohsen | |
| Général Ferrero | } Italy. |
| Professor Guido Cora | |
| Le Commandeur Don Luciano Cordeiro | Portugal. |
| Senhor Torres Campos | Spain. |

Ayant considéré un thème écrit par M. le Général Chapman sur la question de la cartographie de l'Afrique nous recommandon l'adoption de la résolution suivante par le sixième Congrès Internationale de Géographie :—

Il est désirable de recommander à l'attention des Sociétés de Géographie qui ont des intérêts dans l'Afrique, les propositions suivantes. Il serait avantageux :—

1. D'exécuter des travaux topographiques exacts en les appuyant sur des triangulations suffisantes dan les districts de l'Afrique, aptes à la colonisation Européenne.

2. D'encourager les voyageurs à faire plutôt des croquis de grandes regions de terrain que des reconnaissances de routes.

3. De proceder à l'établissement et la publication d'une liste de tous les lieux non explorés de l'Afrique, qui ont été exactement déterminés par des observations astronomiques, avec indication des méthodes employés.

4. De poursuivre l'exacte détermination de la position d'un grande nombre de lieux non encore relevés l'Afrique, en utilisant toutes les fois que cela sera possible les lignes télégraphiques exécutées ou en cours d'exécution.

Nach Kenntnissnahme der Arbeit des Herrn Lieutenant-General Chapman über die Frage der kartographischen Aufnahme Afrika's, empfehlen wir den nachfolgenden Beschluss dem 6-ten Internationalen Congress zur Annahme :—

Dass es wünschenswerth erscheint, die Vortheile zur Kenntniss der Geographischen Gesellschaften welche in Afrika interessirt sind zu bringen, welche genommen werden können :—

1. Durch die Ausföhrung genauer topographischer Aufnahmen, welche auf einer ausreichenden Triangulation beruhen, und zwar von den Theilen Afrika's, welche sich für eine kolonisation durch Europäer eignen.

2. Auf Reisende dahin zur wirken, dass sie sich nicht nur auf Routenaufnahmen beschränken, sondern vornehmlich kartenskizzen grösserer Gebiete liefern.

3. Durch die Herstellung und Veröffentlichung einer Liste aller jener Orte in den bis jetzt kartographisch noch nicht aufgenommenen Theilen Afrika's, welche durch astronomische Ortsbest immungen genau festgelegt worden sind, mit Ausgabe der angewandten Beobachtungsmethoden.

4. Durch die astronomische Feststellung der Lage möglichst zahlreicher und wichtiger Orte in dem kartographisch noch nicht aufgenommenen Afrika, die mit Hilfe der bereits bestehenden oder in der Herstellung begriffenen Telegraphenlinien leicht auszuführen ist.

Having considered the subject of a paper by Lieutenant-General Chapman on the question of the mapping of Africa, we recommend the following resolution for adoption by the Sixth International Geographical Congress :—

That it is desirable to bring to the notice of the geographical societies interested in Africa the advantages to be gained—

1. By the execution of accurate topographical surveys, based on a sufficient triangulation of the districts in Africa suitable for colonisation by Europeans.

2. By encouraging travellers to sketch areas rather than mere routes.

3. By the formation and publication of a list of all the places in unsurveyed Africa which have been accurately determined by astronomical observations, with explanations of the methods employed.

4. By the accurate determination of the position of many of the most important places in unsurveyed Africa, for which operation the lines of telegraph already erected, or in the course of erection, afford so great facilities.

GÉNÉRAL A. FERRERO.

R. TORRES CAMPOS.

V. DANCKELMAN.

PENCK.

LUCIANO CORDEIRO.

E. F. CHAPMAN.

F. SCHRADER.

COLONEL BASSOT.

ERNST VOHSSEN.

LIEUT.-GEN. WAUWERMANS.

A. DE SMIDT.

GUIDO CORA.

M. G. TALBOT.

APPENDIX.

Intelligence Division,

18, Queen Anne's Gate, S.W.,

11th March, 1896.

DEAR SIR,—I beg to forward an extract from the Report of the Surveyor General of the Cape on my letter to the President of the Royal Geographical Society regarding the Mapping of Africa, which I am sending with the accompanying letter of explanation to those of the Delegates to the International Geographical Congress who interested themselves in the subject. I should be grateful if you would kindly give publicity, by means of your *Journal*, to the extract from the Surveyor General's Report and to the letter that accompanies it.—I am, Sir, yours very truly,

The Secretary Manchester Geographical Society.

E. F. CHAPMAN.

[COPY]

18, Queen Anne's Gate, London, S.W.,

March 9, 1896.

SIR,—I have much pleasure in forwarding you, by permission of Her Majesty's Government, and with the approval of the Surveyor-General of the British Colony of the Cape of Good Hope, the accompanying copy of an extract from a report which, together with a map, also enclosed, was prepared by the Surveyor-General last autumn in connection with the proposals made by me at the International Geographical Congress held in London last year, on the subject of the Mapping of Africa, and was forwarded by him to the Cape Government.

The report has been prepared in order to show what has been accomplished by the Colony in the past to further the object in view, and also to invite attention to the measures which, should the necessary funds be forthcoming, are contemplated in the future. I venture to think that these proposals will not fail to interest you.

It will be observed that for the completion of the present system of triangulation the co-operation of the Orange Free State will be required; whilst in order to run the three meridional series, and the transverse series of triangles along the 18th parallel of South Latitude, it will be necessary to apply for assistance both to Germany and to the Transvaal Republic.

In this necessity for the assistance of others lie the germs of that united action which it is my earnest desire to see extended over the whole continent of Africa.

How this may be ultimately attained is a question which requires much consideration; but it would seem to me that the principal element of success is to be found in the formation of an International Committee. The formation of such a committee, whose members could correspond freely with each other, and meet at stated periods to report progress and exchange ideas respecting future extension, would be invaluable, and, indeed, would appear to be almost a necessity in order to secure harmonious and systematic work.

It further occurs to me that, if reports something similar to that of the Surveyor-General of the Cape could be furnished by those intrusted with the survey work in the various African Colonies, and if these reports could be submitted to this Committee for general consideration, no inconsiderable advantage would be derived therefrom. Possibly, too, the work already done by each country might be plotted on a skeleton map of the continent. This, and the publication by the Committee of an annual report, would, I think, be of undoubted value, enabling each country to take note of the progress which had been made by the others, and affording a valuable record on which to build new schemes for extending the work into the interior.

These are but crude ideas, put forward with the utmost diffidence, for your kind consideration. I should be glad to hear from you whether you think them feasible, and at the same time I should be exceedingly grateful for any other suggestions which may occur to you.

I am, Sir,

Yours very truly,

(Signed) E. F. CHAPMAN, Lt.-General.

EXTRACTS FROM A REPORT ON GENERAL CHAPMAN'S PROPOSALS REGARDING THE
MAPPING OF AFRICA, FURNISHED TO THE CAPE GOVERNMENT BY THE SURVEYOR-
GENERAL OF THE CAPE.

In expressing my views on the letter addressed by Lieut.-General Chapman to the President of the Royal Geographical Society, in which he advocates that the Governments interested in the development of Africa should co-operate in order to secure a systematic mapping of the continent of Africa, I shall principally deal with the group of South African States which are in many ways connected with one another.

* * * * *

It would be interesting to ascertain what the Governments who control the development of the numerous African States have done in the cause of African geography and whether the, comparatively speaking, young South African Colonies have done their part. I feel convinced that, considering all circumstances, we have no reason to be ashamed. Since 1840 two large geodetic surveys have been made at

the expense of the Cape Colony, and a third, more comprehensive and costly than the preceding two, was undertaken and recently completed by the Governments of the Cape Colony and Natal combined.

The outcome of these and of a large number of smaller surveys from time to time carried out in the various South African States is the new map of the Colony and neighbouring territories on the scale of 1:800,000 recently completed in this office, and now being printed by Mr. E. Stanford in London. This map will probably be ready for publication in September next.

The details of the geodetic surveys carried out in South Africa since 1840 have been given in an elaborate paper prepared by Her Majesty's astronomer at the Cape, Dr. D. Gill, for the purpose of being read at the International Geographical Congress in London by the Colonial delegate, Mr. A. de Smidt, appointed by the Government to represent the Colony at the Congress. I shall therefore refrain from repeating these details here. Suffice it to say that the surveys of Sir Thomas Maclear (1840-1847), Captain W. Bailey (1859-1863), and Colonel W. G. Morris, R.E. (1882-1893), the recent surveys of Messrs. J. J. Bosman, A. Moorrees, and E. V. Melvill, and the many smaller surveys by various other Colonial surveyors, have all been used in producing the new map about to be published, and that this map is therefore entitled to every reasonable confidence.

Only the first steps have as yet been taken towards providing the means of combining all future surveys in one consistent system, and much remains to be done to bring points of reference within reach of every detailed survey. The absence of secondary and tertiary triangulations is, however, not absolutely fatal to the production of topographical maps on a small scale. The inaccuracies introduced in the new map by compiling disconnected surveys and fitting them into the framework of the main triangulation are hardly perceptible on the scale of 1:800,000 on which the map is constructed. In plans on a large scale prepared for the purpose of defining landed properties these inaccuracies are naturally more apparent.

Existing discrepancies in the old property-surveys are, of course, not remedied by the mere existence of secondary and tertiary triangulations. Re-surveys for purposes of amended titles under the Land Beacons Acts are, however, gradually removing inaccuracies where faulty registration exists. The process is slow, but it is satisfactory to note that the desire on the part of landed proprietors for amended titles is daily increasing. For the systematic connection of these re-surveys and of all future property surveys the supplementary triangulations are absolutely necessary if the full advantages of the main triangulation are not to be lost to the Colony. The operations connected with this necessary work will naturally cover a long period, and when once begun there should be no risk of breaking the continuity of the work, and to secure this I should like to see, if possible, some guarantee given of a continuous annual vote when once the work is commenced. Operations might be first set on foot in the most densely populated districts and proceeded with in sections where the work appears to be most necessary. As the main triangulation has been completed, except as shown further on, there is little fear that this mode of procedure will disturb the harmony of the whole when, in years to come, the great work will be completed.

The maps of the Orange Free State and of the South African Republic are based on triangulations made from time to time for purposes of property and topographical surveys, such as have furnished the details of the new map of the Colony and neighbouring territories, of which mention has already been made. Although these surveys are disconnected, and will probably offer some difficulty to the compiler, they will nevertheless be of great use for mapping purposes when the general triangulation has been extended over these countries.

In British Bechuanaland, surveying operations were commenced in 1886 when Lieut. Laffan, R.E., measured a base line in the valley of the Hart River with a view to the trigonometrical survey of Bechuanaland. The measurements of Lieut. Laffan were completed in 1887, and the first section of the survey was entrusted to Mr. E. V. Melvill, Colonial Surveyor, who carried a network of triangles from Banks Drift northward to Letlayoli. The further extension of the triangulation was made by Messrs. J. J. Bosman and A. Moorrees, Colonial Surveyors, who carried a system of triangles westwards to the 20th meridian in four sections. Although the country is very unfavourable to triangulation, the probable errors in a single observed angle in these four sections are as follows :—

| | |
|---------|-------------------------|
| Section | I. $\pm 1''\cdot41$. |
| „ | II. $\pm 0''\cdot92$. |
| „ | III. $\pm 0''\cdot66$. |
| „ | IV. $\pm 0''\cdot42$. |

Secondary extensions of the triangulation were made for the purpose of farm and topographical surveys. These furnished the means of constructing a map of British Bechuanaland, which need only be connected with the main triangulation of the Colony in order to incorporate it in the systematic survey of South Africa.

The question next to be considered is what should be done to complete and extend the work already done towards mapping South Africa, so that it may, at any time, find its place in the system of African surveys General Chapman has in view, and be joined into this system as a well-defined and, in itself, consistent part of the whole. In the first place there are three triangulations which are urgently required to render the Colonial network of primary triangles complete ; these are :—

1. A chain of triangles joining the north end of the Natal chain to the north end of the Kimberley chain across the Orange Free State. (*See annexed sketch of the Colonial triangulation.*)

2. A chain of triangles, about 70 miles long, to join the eastern part of the Bechuanaland survey to the north end of the Kimberley chain.

3. A chain of triangles, about 150 miles long, to join the western part of the Bechuanaland survey to the north end of Sir Thomas Maclear's triangulation.

These three geodetic operations will complete the Colonial main triangulation.

The further extension of geodetic operations northwards may be taken in hand at any time on the following lines, but the success of the scheme which appears to me to be the best will depend on the co-operation of the Governments of Germany, Rhodesia, and the South African Republic.

In my opinion, three chains of triangles should be pushed northwards. The one from the north end of Sir Thomas Maclear's triangulation due north through the German Protectorate up to its northern boundary, a second from the north end of Mr. E. V. Melvill's triangulation northwards to the Victoria falls of the Zambesi river, and a third from the north end of the Natal chain in a northerly direction through the South African Republic and Rhodesia to the Zambesi river. These three chains should then be joined by a chain of triangles following more or less the parallel of 18° south latitude.

The two eastern meridional chains may, of course, be joined by as many cross-chains as the Governments of the countries through which they pass may deem desirable, and the western chain would become the back-bone on which all further triangulations that the German Government may carry out in the Protectorate could be based.

There is a large gap between the proposed middle chain and the western chain, but, as the tracts of country situated in this gap are reported to be mostly waterless, sandy deserts, there seems to be little or no need for pushing cross-chains of triangles through the gap, seeing that the proposed cross-chain in latitude 18° south will furnish the critical connection necessary for the reduction of the whole system by the theory of "Least Squares."

In order to render the results of the proposed primary triangulation at once useful for mapping purposes, the survey parties might each be accompanied by a staff of trained observers whose task it would be to make rapid topographical surveys with small theodolites as the survey parties move on.

The proposed scheme and its extension over the entire continent of Africa would, if carried out, be a truly international work in which all interested civilized nations might be invited to co-operate. The combination in one large system of all geodetic surveys in Africa would have to be placed into the hands of an international Commission that may be formed on lines similar to the "Geodactische Institut," which has for many years directed geodetic operations in Europe.

If the appointment of such a Commission could be carried, much would be gained in the cause of a systematic mapping of Africa.

Surveyor-General's Office, Capetown,
July 25th, 1895.

J. TEMPLER HORNE,
Surveyor-General.

NEW BOOKS.

HANDBOOK TO THE BOWES MUSEUM OF JAPANESE ART WORK, Streatham Towers, Liverpool. By JAMES L. BOWES, H.I.M. Honorary Consul for Japan at Liverpool. Liverpool, 1894. Price 3s.

THIS is a new edition of the handbook to the unique Museum at Liverpool belonging to Mr. Bowes. The handbook is useful as a guide to the precious and beautiful things in the Museum, and is a beautiful, well-illustrated reminder to take home.

Those members who have had the pleasure to visit the Museum will be glad to possess this tastily got up handbook.

COTTON SPINNING: THE STORY OF THE SPINDLE. Reprinted from the "Diary and Buyers' Guide, 1895," issued by Messrs. Henry Bannerman & Sons. By MR. JOHN MORTIMER. 148pp. Copiously Illustrated with Views of Places, Machines, Portraits, and Old Houses, Mills, Landscapes, &c.

WE are indebted for this contribution to Messrs. Bannerman, who have induced Mr. John Mortimer—a distinguished member of the Manchester Literary Club—to write a series of very well-written Memoirs, illustrative of various phases of art, manufacture, and life.

The style is charming, and the illustrations of old spinning wheels, and of the progress of spinning machinery to the latest developments of Brooks' and Doxey's ring spindles, are very interesting. The engravings are very well done, and add to the interest of the volume. The last of the pictures is a 17th century flax spinning wheel in a lady's drawing-room—a grotesque adaptation of a cottage industry to a modern fashionable fad.

APPLICATION SIMULTANEE ET PARALLELE DU SYSTEME DECIMAL A LA MEASURE DES ANGLES ET DU TEMPS. Rapport par M. J. DE REY-PAILHADE (Mining Engineer), Président de la Société de Géographie de Toulouse. 24pp. Table and Illustrations.

THIS pamphlet represents a good deal of work done by Mr. Pailhade on this subject. The substance of the paper has been brought before the Society, and is to be dealt with at the International Congress of London.

The Toulouse Society appears to have taken great interest in the matter, and several other societies have approved of the suggestions.

LE MASHONALAND. Par le M^{IS} DE NADAILLAC. Paris: De Soye et Fils, Imprimeurs, 18, Rue des Fossés, Saint-Jacques, 1894. 42pp.

THIS is a most interesting reprint from *The Correspondent*, by the Marquis de Nadaillac, on the history, geology, archæology, and present condition of Mashonaland, and gives us the views of this distinguished and scholarly Frenchman.

The *brochure* enables us to look at the Mashonaland question from another point of view than our own, and will well repay perusal.

LA DERNIERE ELECTION MUNICIPALE A POMPEI. Par le M^{IS} DE NADAILLAC. "Extrait du Correspondant." Paris: De Soye et Fils, 1895. 28pp.

AN interesting study from early writers and other sources of a municipal election at this buried city just before its destruction. The author says:—"Peut-être quelques-uns de nos lecteurs ont-ils pris intérêt à cette lutte électorale, et voudraient-ils connaître le nom des vainqueurs. Nous ne pouvons satisfaire leur curiosité. Le Volcan a effacé les traces du passé; les archives ont disparu; les murs seuls conservent les souvenirs de la lutte, et nul n'a pu enregistrer les services ou la munificence de ceux qui devaient être les derniers élus de Pompéi."

STANFORD'S COMPENDIUM OF GEOGRAPHY AND TRAVEL. (New issue.) Africa. Vol. II (South Africa), by A. H. Keane, F.R.G.S. Eleven Maps and ninety-two Illustrations. London: Ed. Stanford, 1895. Price 15s.

THIS volume completes Africa in the "Compendium," and is at this time a most useful handbook. The book is divided into thirteen chapters, and has an index. The maps are easy to read and the illustrations are useful.

This book has been written on the same plan as the first volume; the historical notes being just what a busy man wants to have in this form, whilst the geography and the ethnology is sufficiently definite. The headings of the chapters give some idea of the scope of the book; they are: The Cameron and South East Atlantic Islands, French Equatorial Africa, The Congo Free State, Portuguese West Africa, German South West Africa, Cape Colony, South East Africa, British South Central Africa, Portuguese East Africa, German East Africa, British East Africa, Islands in the Indian Ocean, The West African Archipelagoes. In 656 pages of almost all new-written matter an immense amount of information is given with good type.

PROCEEDINGS OF THE SOCIETY.

APRIL 1ST TO JUNE 30TH, 1895.

The 335th Meeting was held at the Society's House, Monday, April 1st, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Mr. F. C. SMITH, (Simisi), of Uganda, gave a short address on the character of the people of that British possession.

Mr. J. J. GLEAVE addressed the Society on "Notes of a Journey in Italy." (Sec p. 164.) Lantern views, maps, drawings, and MS. diary of the tour were shown.

The Chairman, Chevalier Frochlich, Chevalier Vileta, of Genoa, Mr. S. Oppenheim, Mr. Bellamy, Mr. Wild, and others took part in the discussion.

Hearty thanks were given to Mr. Smith and Mr. Gleave for their interesting and useful addresses.

The 336th Meeting was held at the Society's House on Wednesday, April 10th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Minutes of meetings held March 13th (331) to April 1st (335), were read and approved.

The election of the following members was announced:—

ORDINARY: Mr. W. F. Brownrigg.

ASSOCIATE: Mr. W. Caldwell.

Presentations to the Library were announced, and a letter was read from Major Wingate, in response to the Society's vote of congratulation on the escape of Slatin Bey.

Mr. H. T. CROOK, C.E., member of the Council, gave an address on "The Topography of the Kinderscout District." A large map, drawn by Mr. Crook, and a number of lantern slides were exhibited.

The Chairman, Mr. Leo. Grindon, Mr. Costley, Mr. Bradbury, Mr. J. B. Shaw, the Secretary, and others took part in a lively debate. Mr. CROOK replied, and a vote of thanks was passed to him for his service to the Society.

The 337th Meeting of the Society was held at the Cheetham Town Hall, Thursday, April 25, 1895, at 6-30 p.m.

Mr. S. OGDEN, J.P., Vice-president of the Society, and other members of the Council, held a reception, which was largely attended.

Mr. M. W. THOMPSTONE addressed the Society on "Through Wild Countryside with a Camera," exhibiting a series of lantern views from photographs taken during his journey.

Mr. S. OGDEN spoke of the interest and value of geographical studies, and referred to the work of the Society.

Miss A. Willoughby, Mr. J. D. Wild, Mr. T. P. Cooper, Mr. J. H. Moss, Mr. M. H. Chapman, and Mr. G. Day gave selections of music during the evening, which were very well received.

Mr. Glossop and Mr. Lowther had prepared a number of slides from photographs taken by them in Moscow and St. Petersburg, showing the large cotton mills, the work people, markets, river craft, houses, and daily life of the Russians in those great cities.

Thanks to Mr. Ogden for presiding, and to the ladies and gentlemen who had given their kind assistance, and to Messrs. Glossop and Lowther, were tendered very cordially. Mr. OGDEN responded.

The 338th Meeting of the Society was held in the Chemical Theatre, Owens College, on Thursday, May 2nd, 1895, at 7-30 p.m. Dr. A. W. WARD, Vice-Chancellor of the Victoria University, in the chair.

The Venerable Archdeacon MAPLES, Bishop elect of Nyasa, in Central Africa, gave an address on "Nyasaland," and described the country, the people, the work of the new government, discussed the question of slavery, the work of the missionaries of all branches, described the plantations, productions, and probabilities of commercial development, and illustrated his address with a new map of the district and lantern slides.

Mr. R. C. PHILLIPS moved, and the Rev. S. A. STEINTHAL seconded a vote of thanks to the Venerable Archdeacon for his address. Questions were asked, to which the Archdeacon replied, and said it was always a pleasure and an inspiration to him to come to Manchester.

Mr. S. OPPENHEIM, the Honorary Treasurer, moved a vote of thanks to the College authorities for the use of the theatre, and to Dr. Ward for presiding. Mr. F. ZIMMERN, Hon. Secretary, seconded, and the Vice-Chancellor (Dr. WARD) replied.

The 339th Meeting was held at the Society's House on Monday, May 6th, 1895, at 7-30 p.m.. Mr. MARK STIRUP, F.G.S., in the chair.

Minutes of meetings held April 10th (336) to May 2nd (338) were read and approved.

The election of the following members was announced:—

ORDINARY: Messrs. T. G. Barker and William Hodgson.

ASSOCIATE: Miss Gannon, Mrs. Thomas Chadwick.

Mr. DERBYSHIRE MAYALL addressed the members on "Petroleum; its use Mechanically, Commercially, and Medicinally." The address was illustrated with samples of the oil in various states, and of various bye-products. Maps, diagrams, and tables were exhibited.

The paper gave rise to considerable discussion, Messrs. Wilde, Belisha, Herbertson, Bellamy, and others taking part. Mr. MAYALL replied.

The very best thanks of the Society were tendered to Mr. Mayall for his very valuable paper.

The 340th Meeting of the Society was held at the Ardern Arms, Ardern Hall, Denton, on Saturday, May 11th, 1895. Mr. B. O'CONNOR in the chair.

Mr. O'CONNOR led the members from the Reddish station by the works of Messrs. Bradshaw, Hammond & Co., along the Cheshire side of the river, through the woods to Ardern Hall, giving a description of the valley. The history of the Ardern family, and their connection with Cheshire, was

referred to; the remains of this "moated grange" were described, with some remarks on the architecture of the period, and the fine and commanding position of the house and tower was pointed out.

After thanking Mr. O'Connor for his able guidance, the members returned to the train at Heaton Chapel by way of Holt Woods and the Reddish Mills.

The 341st Meeting was held at the Society's House, Wednesday, May 15th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Mr. E. G. W. HEWLETT, M.A., addressed the members on "The Position of Geography as a School Subject." The address was of great importance from an educational standpoint, and raised a number of points for discussion, in which Messrs. WILDE, HERBERTSON, the SECRETARY, TRISTRAM, SCHOLFIELD, and others took part.

Mr. HEWLETT replied, and Mr. REED moved a vote of thanks for his address, which was seconded by Mr. TRISTRAM, and carried with acclamation.

The 342nd Meeting of the Society was held at Worsley, Saturday, May 18th, 1895, at 3 p.m. Mr. Councillor BERRY in the chair.

Mr. W. JOHNSON and Mr. T. FARRON kindly led the members from Worsley station to the gates of Worsley Hall, in accordance with Captain Heaton's permission.

A large party of members attended, and the gardens were inspected, but owing to the earliness of the season there were very few flowers, and the members were not allowed to see the glasshouses. The home farm and the Tower were visited, and on the whole a very pleasant afternoon was spent. The reception was not kindly, for, although Captain Heaton was in the village, he did not show himself, and if the Society visit the Park again it should be on the invitation of Lord Ellesmere, and not of an agent.

No votes of thanks were passed, as the company felt none were due.

The 343rd Meeting was held in the Society's House, Monday, May 20th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Minutes of meetings held May 6th (339) to 18th (342) were read and approved.

The election of the following members was announced:—

ORDINARY: Messrs. E. H. Campbell, James Cheetham, J. Morris, Jun.

ASSOCIATE: Miss M. Woolston.

Correspondence was read.

Mr. THOMAS COSTLEY addressed the members on "The Giant's Causeway, and the Way Thither." The address was illustrated with maps, and a fine series of photographic slides, taken by Mr. H. Gray, M.R.I.A., Belfast, and lent to the Society for this address.

Mr. COSTLEY gave an interesting account of County Antrim, starting from Belfast and following the coast to the Causeway. It was much appreciated by the members, who thoroughly entered into the racy descriptions of the scenery, and life of the peasantry, as given in Mr. Costley's inimitable style.

Mr. GEORGE PERRY, Mr. C. H. BELLAMY, and Mr. J. J. GLEAVE addressed the meeting, and very hearty thanks were passed to Mr. Costley and Mr. Gray, on the motion of Mr. B. O'CONNOR, seconded by Mr. J. H. REED.

The 344th Meeting of the Society was held at the Free Public Museum, Liverpool, Saturday, May 25th 1895, at 5 o'clock p.m. Mr. W. H. PICTON, Chairman of the Museum Committee of the City of Liverpool, in the chair.

The various collections of an ethnographical nature, including those of Mdlle. Tinné and Dr. W. G. Lawes, have been arranged on a geographical basis by the distinguished Director of the Museum, Mr. H. O. Forbes, LL.D.

The Chairman (Mr. Picton) and the Director, having invited a party of members to see the collection, received them at the Museum. The members were joined by Mr. O. W. Jeffs, and Mr. P. Cowell, Librarian of the Free Library.

After some hours spent in a careful examination of the specimens, and the discussion of anthropological questions, adjournment was made upstairs for refreshments. After tea, reference was made to the fact that Sir J. Picton gave the members a welcome on a previous occasion, with the late Curator and the Rev. H. H. Higgins, whose little books, descriptive of the Museum and its contents, have had great influence elsewhere, and whose persistent and patient work is seen in the fine botanical, fixtile, textile, archæological, and fine art collections found in these handsome buildings.

The SECRETARY proposed a very hearty vote of thanks to the Chairman, the Director, and the Committee of the Museum for their great courtesy and kindness. Mr. Councillor HIGHAM, of Accrington, seconded, and Messrs. G. JACKSON, T. COSTLEY, and O. W. JEFFS supported. Mr. PICTON and Dr. FORBES responded.

The 345th Meeting was held in the Society's House, Monday, May 27th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

Minutes of meetings held May 20th (343) and 25th (344) were read and approved.

Mr. A. J. HERBERTSON, Lecturer in Geography at Owens College, addressed the Society on "Edinburgh: a Study in Geographical Cause and Effect." The address was illustrated with a collection of fine etchings of Edinburgh, geological and topographical maps, and a series of fine photographic slides, lent by Professor Geddes, of Edinburgh.

Questions were asked and replied to, and Mr. C. H. BELLAMY moved a vote of thanks to Mr. Herbertson, seconded by the SECRETARY, which was carried with acclamation.

The 346th Meeting was held in the Society's House, Friday, May 31st, 1895, at 8 p.m. Mr. THOS. DENTITH in the chair.

Minutes of meetings held May 27th (345) were read and approved. A letter from the Rev. S. A. Steintal was read, expressing regret at his inability to be present.

Mr. J. HOWARD REED, Hon. Sec. of the Victorians, gave a paper on "British Central Africa" (See p. 168), and exhibited a collection of photographs lent by the Secretary of the Universities' Mission, and maps prepared for Mr. Consul Johnston's report on Nyasaland.

Mr. BURTON moved, and Mr. STOTT seconded a very hearty vote of thanks to Mr. Reed. The motion was supported by the SECRETARY, and others. Mr. REED responded.

The arrangements for the International Geographical Congress, to be held in London, and a letter from Mr. E. Ravenstein on the Exhibition, were referred to.

The 347th Meeting of the Society was held at the Bradford Road Gas Works of the Manchester Corporation, Wednesday, June 19th, 1895, at 6 p.m. Mr. Councillor W. SHERRATT, J.P., in the chair.

Mr. Sherratt then had the members conducted over the Gas Works, beginning with the raw coal and cannel, and following the process until the gas was finally stored in the great gasometers.

It was a most interesting and valuable demonstration of the application of science to municipal needs. The work of the builder, the chemist, the mechanic, the use of the bye-products, the work of administration, and the profitable nature of the undertaking for the owners of the works (the rate-payers) were all pointed out. The future use of gas in other ways than for lighting purposes, and the probable large extension of plant to meet the growing needs, was suggested.

Very hearty thanks were passed to Councillor Sherratt, to the Corporation to the guides. Mr. SHERRATT responded.

The death of Alderman Makinson was referred to, and it was stated that a letter of condolence had been sent to Mrs. Makinson, at the instance of the Council.

The 348th Meeting of the Society was held at Mr. Hardy's, Nag's Head, Castleton, Saturday, June 22nd, 1895, at 6 p.m. Prof. T. H. CORE, M.A., in the chair.

Professor W. Boyd Dawkins, M.A., F.R.S., led a large party of members from Edale over Mam Tor and down the valley, past the Blue John and Speedwell Mines, through the Winnats to Castleton. Several addresses were given by the Professor on the topography, geography, and geology of the district, and a most interesting description of the ancient roads and the hill forts was given at Mam Tor. The fortifications at Castleton were examined with great care.

Mr. DENTITH moved a very hearty vote of thanks to Professor Boyd Dawkins for his kindness in leading the party, and for his several lucid and valuable addresses; Mr. BOWES seconded, and was supported by Mr. MATHER and others. The PROFESSOR responded.

After tea some members went to inspect the cave at Castleton, and walked round the village.

The return home was made with some difficulty, the traffic arrangements of the Midland Railway Company being inadequate to the requirements, and altogether unsatisfactory.

THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY.

CHINA'S TRIBUTE TO THE DEAD.

Communicated by the Rev. F. GALPIN (for many years resident in China).

WHEN I arrived at Ningpo, 29 years ago, I was conducted by a friend to his home, about half a mile from the wharf. He took me along a narrow, stoney path (which I afterwards discovered was the public road), through several rice-fields, thickly occupied by graves and bare coffins, which appeared to be placed on the ground without any regard to order, or any care for travellers. My first impression was that my friend was leading me through an old, and much neglected, and over-crowded graveyard; but this impression was upset, because between the graves there were several unoccupied pieces of land which appeared to be devoted to agricultural purposes. My friend's house was situated right in the midst of this large graveyard, and some of the coffins were placed within only a few yards from the walls of the house. Subsequently I noticed that many of the tombs were built of stone, durable and costly, and surrounded by cedar trees; these occupied a large area. Some had upwards of an acre of land reserved, and must have cost a considerable sum of money. As I extended my knowledge of the district by walks in the country, I saw only a wider view of my first vision. The large rice-fields were all placed under tribute to the dead in a similar manner. The graves were so numerous that they did duty as hedges and boundary walls, of which there were but few. As a rule, rice producing land, *i.e.*, land low and flat and conveniently near rivers or canals, is the most valuable because the most productive.

Many of the best fields, very near the water, and therefore most suitable for food production, had been levelled up some feet above the rest of the land, and set apart as the cemetery

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of some rich man. This means that in numerous cases a rich Chinaman had robbed his descendants of enough land to feed one or more persons.

A visit to the hills, of which there are many in the province of Chekiang, the slopes being very valuable for tea cultivation, revealed a similar condition of things. Indeed, on the hill sides, the death tribute was perplexingly evident. The Chinese mind must have regarded the hills as specially and designedly raised for the accommodation of the dead. Often I could see the best and largest portion of a beautiful slope given up to be the graveyard of one man and his wife, for, as a rule, a man's sons sought for repose in a quiet and picturesque spot far away from the resting-place of their father.

In some instances, scores of acres are thus taken out of cultivation and planted with groves of trees, which are regarded as sacred and are seldom cut down for use, as such an act is considered most sacrilegious, and would be followed by severe punishment in both worlds. If we bear in mind that a similar tribute is paid to the dead all over China, any deviations being simply determined by the financial conditions of the people, we may imagine the heavy price paid by the Chinese in their observance of this wide-spread feeling of reverence for the dead.

Certainly more than one-tenth of the best land in China is thus appropriated, and besides, a large quantity of land under cultivation has been consecrated to the use of the departed, for the repair of graves and offerings of food, and in the building and repairing of ancestral temples, which are erected for the sole use of "the great majority."

It must be said that China bears the heavy burden of "the dead hand" in a most generous manner.

Fortunately for the living, the disintegrating forces of nature work in their behalf, and quietly break up and conceal the memorials of the dead; consequently, only a few tombs remain intact for a century, and this natural removal is readily accepted by the people, and has now made current and common the idea that after the third generation the spirits of the dead may be allowed to slip away into the oblivion of a forgotten past; and if any mind, of more than average affection, is troubled concerning the actual condition of the soul of a great great grandfather, the Buddhist priest supplies consolation in the comforting thought of a probable happy re-incarnation in this world, or a blessed rest in the kingdom of Buddha in the West.

Many of my readers will have already perceived that the costly tribute paid to the dead is a part of the common Chinese virtue of ancestral worship, which may be called most truly, and without any liability to the charge of exaggeration, the sheet-anchor of Chinese religion.

This idea is suggestively illustrated in the compositions of the Chinese character for religion: it is a compound word made up of two others, namely, a *discourse* and *filial piety*. Religion, then, becomes the doctrine of filial piety. This doctrine, as interpreted by Confucius, consisted chiefly in reverence in burial, and devotion in sacrifice, in behalf of the dead.

There is something very attractive to the Chinese mind in the common custom which lays such a costly tribute upon rich and poor, and which they regard as a sacred duty binding all alike.

Probably its strength lies in the fact that, according to Confucian teaching, to live in the hearts and minds of their children is the only immortality possible; hence the aim to secure a name and a place in the family temple, and by means of a durable grave, live again and live on in the living and filial hearts of their descendants. Such an immortality, which repeats its virtues in its children, and makes them its successors, and so renders the fathers "immortal in the minds of those made better by *their* deeds,"* although contrary to the teaching of Buddha, is the only after-life that Confucius taught, or his followers hope for. The burial of loving parents in sorrow, and without hope of future meeting, must tend to give the custom uncommon gravity, and great solemnity to all who have any genuine love or gratitude to the departed, and cause even the poor to make great personal sacrifice, so that the happiness and repose of the dead may be secured.

But if I have hitherto led my readers up to a singularly beautiful aspect of Chinese life, and if now they seem face to face with a rare picture of family devotion, no one regrets more than the writer that the impartial mandates of truth demand that the scene must be changed, and give place to one much more coarse and common and much less beautiful and attractive.

History tells us how quickly a race loses its best ideals, and how soon its Edens are forfeited, and how quickly the refined and the pure become coarse and polluted. Humanity, when at its best, has only a few elect souls to boast of; the refined and pure are rare and uncommon. We need not then be surprised to discover that even the Chinese, starting with such a noble ideal of devotion and duty, have fallen and become depraved. The Chinese have certainly lost their disinterested and self-sacrificing devotion to their dead. How comes it, then, that the death tribute is still paid? It is still true that the Chinese are yet spell-bound by this custom; and so much so that they make it a standard or touchstone, by means of which they examine and criticise all systems of religion or civilisation.

The ordinary Chinese mind is shocked at the apparently careless and irreverent treatment of the dead, which seems to

* Altered from George Eliot.

them to be shown by the hasty burial so common amongst European nations.

Our usual custom of summary burial affords much material for sarcastic merry-making to the Chinese litterati, who are never tired of saying that such methods show the brutal and coarse quality of our boasted progress.

The instances recorded in the Gospels wherein the Christ is reported as saying, "Follow me, and leave the dead to bury their own dead," seems to the Chinese to be extremely harsh and severe. The Chinese hold a view exactly opposite to the Jewish idea. To the Jews a dead body was regarded as an unclean thing, and contact with it was supposed to make men ceremonially unclean and impure; but in China to come into contact with, and render service to, a dead man is regarded as a sacred duty. I presume we have now found the reason why most Chinamen, who die abroad in strange and foreign lands, are placed in coffins which are carefully conveyed back to China. Some Chinese have expressed to me a feeling of strange wonder why the bodies of certain wealthy Englishmen have been consigned to the earth so far from home; but these men have admitted that by carefully keeping our European cemeteries in neat order we had demonstrated that we are not totally depraved.

In the few sentences which immediately precede this, I have endeavoured to show that the Chinese still keep up their time-honoured custom of reverence for the dead. I will now try and show the radical change of thought and motive which makes the custom so popular and powerful.

Most of my readers will have heard of that arch enemy of all progress and change in China, called *Fung Shuy*. Standing by themselves, these two words represent two very useful elements, namely, wind and water; but, when united, they mean a mysterious and undefinable power, which may be spoken of in our language as Geomancy, but this term neither exhausts its meaning nor affords any satisfactory explanation.

The term seems to be applied metonymically for the vital force of nature, a kind of impersonal Providence that holds the power of prosperity and good fortune in its grasp.

The Chinese professors of this mystery declare that the dead men in their graves are as much related to the living as the roots of a tree are related to the branches. And, as the influence of nature upon leaves and branches is felt in the roots, so the living have close and vital relations with the dead.

Again, as a strong root sends forth healthy branches and superior fruit, so if the dead are resting in their graves surrounded by favourable conditions, they are able to secure blessings and prosperity for their children.

But this prosperity arises from material sources, it is carried

by genial winds, and is brought near by refreshing streams. Again, all good or lucky forces come from the south; but evil and bad luck come in chilling winds from the north. The Chinese, in these speculations, seem to have stumbled over a great truth, namely, the effect of climate and soil upon the life of the human race; but they have not discovered the truth, they have only met it in their way, and have stumbled over it and missed it.

To-day in China the great problem of life is, How to find a suitable resting-place for the dead, so that bad luck may be avoided and good fortune secured to the living.

This not very luminous, and certainly not very elevating, doctrine of the *environment of the dead*, is now the radical motive which leads the Chinaman to pay such a heavy tax to his dead, and so gain for himself present prosperity. This comparatively modern theory of the relations of the dead to the living has imposed an extra burden on the people. Formerly if a man had chosen a site for his grave on land sufficiently high to ensure security against floods, with shelter from northern storms, he was content. But now there are in each town several professional geomancers, some of whom have won a reputation by their insight into the mysteries of Providence, and no prudent Chinaman will venture to select a burial site without consulting one or more of these experts. The method of procedure is as follows: When a Chinaman is in easy circumstances he will engage one of these professors of the occult art to accompany him on a voyage of discovery. The gentleman will hire a covered boat, and take his servant and provisions enough for a day or two. It is his duty to entertain the professor, who only brings his bed, and books, and compass. When all is ready, they start and make for some favourite district amongst the hills. Possibly the geomancer, who is seldom lacking in cunning, will hint that he has already seen a most promising position, but owing to the meanness of his previous employers he had kept secret from them this choice site.

We will suppose that the site is found satisfactory, then negotiations are opened with the owners, and they at once ask an exorbitant price, possibly as much as 20 times the market value; for, if such a plot of land will bring good fortune to another family, the owner had better keep it and secure the luck for his own.

The writer has often been stopped and questioned, when climbing hills for mere exercise and recreation, by natives who persist in believing that he is an Englishman, and is hunting for some lucky ground. It is useless to deny the charge, and to say that Englishmen do not believe in any such nonsense, for the sceptical native only concludes that the foreigner is prevaricating, and his movements must be carefully watched.

Perhaps some explanation of the Chinese idea of the intimate relations between the living and the dead may be found in the native theory of death. According to Chinese belief, at death the soul still exists, and often uses the grave as a home. Hence the Chinese custom of placing the coffin on the surface of the land, and building a tomb over it as a home or shelter.

To dig into the ground and cover up the coffin might cause the spirit considerable inconvenience, if not suffocate it altogether. This theory of the existence of spirits after death causes the Chinese to purchase coffins and erect tombs at a cost far beyond their means.

It is considered highly creditable to sons to involve themselves in large debts, if the money is spent upon a father's grave; and if an Englishman should suggest that such a heavy expenditure is unwise, and imprudent, and unnecessary, he is scornfully regarded as an unwise and unkind reprobate.

It frequently happens that a son will spend more than one year's gross earnings over the funeral of his father.

It should also be remarked that the elaborate system of sacrifices and offerings presented to the departed largely augments the sum of the death tribute.

Chinamen seldom take a pleasure trip, but even poor families pay at least one visit a year to the graves of their ancestors; and as the rate of travelling is slow, and many of the graves are not less than fifty English miles away, much time is occupied and great expense incurred in this visit. The most popular season for these trips is Easter week; at that time boats are in great demand, and can only be secured by paying double the usual price.

Then there is the popular feast which might be called "All Souls' Month," for it lasts for a whole month, and every shop and house takes its part, and pays a due proportion of the expense. The souls of the dead are supposed to come home this month, and must be generously entertained. One great item in the cost is the outlay in paper money, made of paper covered with attenuated tin-foil. This useless and unproductive business of making paper money to burn for the use of the dead gives labour to tens of thousands of poor men and women and girls in China; and perhaps the best thing that can be said concerning this outlay is that the largest portion of its cost is distributed in wages to the needy poor, who are engaged in its manufacture.

I pass over the cost of candles, incense, paper clothing, priests' fees, and extra food; I also will say nothing concerning the large sums which are appropriated by the collectors, who are usually idle bullies; but I must point out how this superstitious reverence for the dead blocks the way of true progress and genuine prosperity.

One of the main obstacles to the opening of the country by the construction of railroads has hitherto been, that such an opening of the land would interfere with the rights of the dead. Their peace would be disturbed by removal, and their anger at such an innovation would be visited upon their faithless and unfilial offspring. For many years the introduction of railways has been impeded by this powerful superstition, and the use of the electric telegraph was also hindered for a long time, and even now it is still strong enough, in some places, to keep out the much-hated improvement.

This opposition seems reasonable to the average Chinaman, for he believes that the surface of the earth, with its streams and plains, and hills and rivers, are all of Divine appointment. If a hill is cut through, or a valley is bridged over, the natural form of the earth is changed, and the result will be general calamity to the people. This superstition also hinders English commerce, for somehow the idea has taken possession of the Chinese mind that the gods do not approve of their commercial intercourse with foreigners.

As a rule, the Chinese reject all foreign material in their extensive manufacture of burial clothes, lest the wearers should be subject to severe punishment for their sin of buying and wearing foreign material.

Before China was opened to foreign trade, and when Canton was the only market where foreign goods could be obtained, foreign made cloth was sold under the name of "Buddha's Cloth," and as the pious thought it was made in Buddha's land (India), it was eagerly sought for, and a high price paid for it, for the very purpose of making burial garments; to be clad in it might help the happy wearer to enter Buddha's world of supreme delight. But the arrival of the very same material at each open port, under its proper name of foreign cloth, broke the spell, discovered the fraud, and prevented the use of the material for religious purposes. It is not necessary to show further how the power of the dead hand tells against true progress in China.

Hitherto China has been bound hand and foot by the bonds of this strong superstition. It has the same answer ready to give to all hints and suggestions. If it be suggested that China should go in for a system of education that might largely help the people, the suggestion, if noticed at all, has been met with the apathetic response, "What was good enough for our fathers is good enough for us;" but this is only a more plausible way of saying "the old is better."

In China there are ample material resources to make life worth living; there is an abundant supply of coal and iron, and the climate and soil are favourable for the production of wheat, rice, cotton, silk, tea, hemp, indigo, fruit, and vegetables. The

rivers and sea are well stocked with good fish ; and sheep and oxen, and pigs and poultry, are easily raised. But still most of the people are miserably provided for, and are compelled to struggle hard to keep body and soul together ; and yet material for moderate prosperity for all is within view, if enlightened and healthy means were employed. But such a happy consummation is at present hindered by the pressure of the "dead hand." China, as she is at present governed, may be compared to a family of hungry children, struggling for a meagre existence, while the larder is full of wholesome provisions ; but the master of the house has locked up the larder, and has died and been buried, with the key firmly grasped in his clammy hand.

Surely there must be some Chinese mind shrewd enough, and wise enough, to see the situation. When will such a leader arise ?

NEW BOOKS.

MERCANTILE MANCHESTER : PAST AND PRESENT. By JOHN MORTIMER.

With forty-seven Illustrations. Manchester : Palmer and Howe.

MR. MORTIMER'S book has been read by a considerable number of our members with great pleasure. It contains a large amount of information for which there is now a wide-spread desire, and that information is pleasantly given. The descriptions of the early conditions of Manchester (i.) in 1538, as "the best builded, quickest, and most populous toune in all Lancastershire"; (ii.) in 1644, as consisting "mainly of two narrow streets, or, rather, lanes—Deansgate, which extended to the present Back King Street, and Market Sted Lane, which extended to about the present Spring Gardens"—and (iii.) in 1650 as "a mile in length, the streets open and clean kept," are not, at first sight, easy to reconcile, but careful readers of the book will probably be able to solve the difficulty. The illustrations are numerous (forty-seven) and well chosen. They are the results of that art of photography which has become so popular in recent years, and are equally useful as exhibiting the merits as the defects of that art for book illustration.

- (1) *LINGUAE GUARANI GRAMMATICA* and (2) *LEXICON HISPANO-GUARANICUM*
a Rev. patre Jesuita Paulo Restivo, secundum libros Antonii Ruiz de Montoya denuo edita et adaucta opera et studiis Ch. Fred. Seybold. Stuttgart: William Kohlhammer.

DR. SEYBOLD'S new and enlarged editions of the works of the Rev. Jesuit have been added to the library. The circle of readers to whom they are addressed—those who combine a wish to study the Guarani language with a good knowledge of Spanish—is a small one, but that very fact will probably lead to a warmer appreciation of their value on the part of those who can use them. We trust that such members of our Society will not be slow to avail themselves of Dr. Seybold's painstaking and valuable labours, for the presence of such books in our library is an important evidence of the cosmopolitan character of the Society, and the wide extent of its aims.

REPORT TO THE MANCHESTER GEOGRAPHICAL
SOCIETY ON THE SALE AND DISTRIBUTION
OF ORDNANCE SURVEY MAPS.*

By Mr. HENRY T. CROOK, C.E.

Re the Departmental Committee appointed "to consider and report upon the arrangements it is desirable to make for the sale and distribution of Ordnance Survey Maps."

9, ALBERT SQUARE, MANCHESTER,
29th January, 1896.

To the Secretary of the Manchester Geographical Society.

DEAR SIR,

1. In reference to the resolutions of the Council and the recent correspondence with the Board of Agriculture on this matter, a copy of which you have been good enough to send to me, I am gratified by the compliment which the Council pays me in having suggested to the President of the Board of Agriculture that I should be placed upon the committee, and regret that the suggestion of the Council has not been accepted, as I feel that I could, from my special knowledge of the Survey and its work, have been of material assistance to the committee in the inquiry.

2. In accordance with the wish of the Council, I have drawn up the following notes on some points to which I think the attention of the Committee of Inquiry should be directed.

3. In considering "what arrangements it is desirable to make for the sale and distribution of Ordnance Survey Maps," it is first of all necessary to get clearly before us the object to be attained and then the best means of achieving it. Object to be attained.

4. If it be assumed that the object is that all the publications shall be easily and quickly accessible to the public, then I think it is reasonable to demand—

(a) That in all the larger centres of population the topographical maps should be at once obtainable, that is, kept in stock, over an area embraced in a circle of at least 25 miles radius round the particular locality, and also of the principal tourists' districts within 100 miles.

* See Report of the Departmental Committee, c. 8147 (1896); also Minutes of Evidence, c. 8148 (1896).

(b) That the cadastral maps and special maps should be obtainable with the least possible delay, which should not exceed 48 hours, except when ordered from remote districts, or when the local agency is at a greater distance than 250 miles from the dépôt of supply.

(c) That at each town agency the local town plans should be obtainable at once—that is, at least one complete set should be stocked in the particular town concerned.

5. The inquiry resolves itself practically into an examination of possible systems of sale and agency to find which will best meet these requirements.

Small amount of sales sometimes attributed to the present system of agency.

Presumably the committee has been appointed because of the notion which is generally prevalent that the present system of agency is in a large measure responsible for the existing difficulties, and for the consequent small annual amount of sales of the maps and the indifference of the public to the publications of the Survey.

6. At the Leeds meeting of the British Association in 1890, in a paper on the present state of the Ordnance Survey, I said—

“There are only three ways in which this condition of things can be explained. They are :—

(a) That even with the schoolmaster abroad the present generation requires fewer maps.

(b) That the maps are not accessible, and therefore not known.

(c) That the maps do not meet popular requirements.

The first explanation is obviously untenable; there is a good deal to be said for the second; but, after careful examination and inquiry, I have come to a decided conclusion that there is far more importance to be attached to the third.

We cannot arrive at a right conclusion as to what it is that stands in the way of the full and complete utilisation of the Ordnance Survey, unless we take into consideration its work as a whole.”

Amount of sales dependent rather on suitability of production to public requirements.

The result of the agitation then set on foot was the appointment of Sir John Dorington's Committee of Inquiry of 1892. In giving evidence before that committee I endeavoured to show the intimate relationship and dependence of the sales upon the style, quality, price, and condition of the maps produced, and that frequent changes in the style, mode of production, and price make it very difficult to ensure that the agent shall have knowledge of the various styles and condition of the different maps. Consequently, the public, as a general rule, does not know what kinds exist, or the purchaser gets something different from what he asked for, or fails to get it at all, or finds he has to pay an exorbitant price for a very small area of map. On that occasion the chairman ruled that the question of agency was outside the scope of the inquiry, see minutes (qy. 1565); although subsequently a large amount of evidence was taken upon it. This change was no doubt due to

the increased knowledge of the subject which the members of the committee acquired as the investigation proceeded.

7. It is impossible to deal with the question of agency apart from the nature, quality, and quantity of the goods to be sold, because in considering who would make the best agent we must know what he has to do, what knowledge he must possess, and what will be the difficulties he will have to contend with. It may be that the committee will consider that these matters are outside the scope of their inquiry. If so then the inquiry will be futile, even if it be not harmful. Costly blunders have been made before in consequence of dealing with the agency problem as if it were a mere matter of "handing over the maps to the public." Before a new system is tried it would be well to be sure that there are strong reasons for supposing that it will work better than the existing system, and this assurance cannot be obtained without a knowledge of the agent's work and of the varied character of the goods to be dealt in, as well as investigating the causes of, and the responsibility for, the inconveniences, difficulties, and delays which, no doubt, do arise from time to time and of which the public rightly complain.

8. In his evidence before the committee of 1892, Mr. J. Wyld said (qy. 2,967 *et seq.*) that he had had as many as 100 sheets of Ordnance Maps returned on his hands in one week owing to mistakes made by customers in ordering. If mistakes can occur in this wholesale manner with a map-dealer of such long and wide experience of the trade and of the public and the mistakes they are likely to make as Mr. Wyld, it can easily be conceived that in the provinces, where the sale of Ordnance Maps is usually only a branch of a bookseller's or stationer's business, the difficulties of the agency are enormous. Mr. Wyld's experience.

9. I now purpose dealing with some of these difficulties which must be faced in making any "arrangements for the sale and distribution of Ordnance Survey Maps," illustrated with some examples from my own experience. I will then examine one or two of the principal suggested arrangements to see how far they would be likely to meet these difficulties in their daily working.

10. TOWN PLANS.—The plans of the town in which the agency is situated should certainly be kept in stock, and when once the somewhat complex system of sheet numbers has been mastered there should not be much difficulty to the agent in satisfying himself as to the particular sheets which his customer requires. Difficulties of agencies in selling Town Plans.

11. The provincial agents (or sub-agents as they are now called) do not always know what indexes are published. The index to Manchester and Salford, $\frac{1}{3000}$ for instance, was published piecemeal as the maps came out, each section showing only the maps contained in a 25in. sheet. These indexes cost altogether 2s. 6d. Subsequently an index in one sheet has been published* costing 1s.; but the Manchester agent did not even know of its existence a few

* I was in error in assuming that this one-sheet index had been published; although produced in 1892 and shown to the Committee of that year as the Manchester town plan index, it was not supplied to the chief agent until March 9th of the present year.—H.T.C.

weeks ago, and was still using the sections, which it is needless to say are extremely puzzling for the uninitiated to understand. The sub-agents should be supplied with copies of the one-sheet index gratuitously; at present they have to pay for them. That is to say they have to pay for information to enable them to sell the Government maps. The charge of 1s., too, is a preposterous charge to make to the public. This class of index should not be charged more than 2d.

'Old' and 'new'
Town Plans.

12. The agent should be aware that of most towns there are two maps, the old survey and the new, and also of the different scales and of the different modes in which the buildings are indicated. For he should be able to advise his customers that in some cases, and for certain purposes, the old map is better than the new, and that the style and price of the map of his own town is no indication whatever of the style and price of the map of the next town, *e.g.*: In the Manchester $\frac{1}{5000}$ town plans the buildings are ruled and the sheets sold at the uniform price of 2s. 6d. If any customer should want a plan of property, say in Bolton, the agent should be able to point out to him that he may be incurring an outlay of 11s. 6d. per sheet; the $\frac{1}{5000}$ town plan of Bolton being coloured, there are four different prices according to the amount of colouring. The old town survey of Bolton and of Manchester is on the $\frac{1}{10500}$ scale, a beautifully engraved map, perfect in every detail. If the property of which a plan is required (either for conveyance or other purposes) is old and has not undergone alteration, the old plan is the better of the two. It is true it is only half the scale, but measurements can be made from it quite as closely as from the new $\frac{1}{5000}$; the coarseness of the latter neutralises any advantage which might have been obtained from the larger scale, whilst the price per unit of area depicted is frequently 16 times as great. Thus for an equal area of the town of Bolton the new map will cost the purchaser £2. The old map will cost him 2s. 6d.

Relation of
Town Plans and
cadastral survey

13. There remain one or two other points in connection with the Town Plans of which a competent agent should possess some knowledge. He should be acquainted with all the different senses in which the word "cadastral" has been and is still used by the Survey officials, the Treasury, the War Office, and the Board of Agriculture, and with its real meaning, which cannot be better described than in the words used at the Brussels Congress of 1853:—

"Nous proposons finalement que le cadastre soit fait de manière à ce qu'il puisse, avec le temps et en vue des règles de la proscription, devenir le titre probant de la propriété; car nous ne voulons pas que le cadastre soit seulement un instrument fiscal; nous voulons que sa mission soit plus élevée; nous voulons que le cadastre soit l'inventaire de la propriété foncière du pays, le grand livre où chaque propriétaire puisse trouver les titres de sa propriété; nous voulons que le cadastre soit la base de la statistique du territoire, de la statistique agricole, du système hypothécaire, du

credit foncier, et en un mot, de toutes les questions qui concernent la propriété.

"Nous entendons que sous ce point de vue, l'organisation du cadastre est un des plus grands bienfaits que l'on puisse rendre à un pays."

14. He should understand that on account of the small size and number of holdings in urban areas the cadastral plan must be on a larger scale than for the country districts. He will then be able to explain to the public, which is just awakening to the value of a cadastral survey, that the town portion of it was abandoned in 1893 on the pretext of maintaining the cadastral maps.

Town Plans part
of the cadastral
survey.

15. *The $\frac{1}{2500}$, commonly called the 25in. map*, and sometimes the "Parish Map," and by the Committee of 1892 and the Board of Agriculture the "Cadastral Map."

The pitfalls for the agent and would-be purchaser of sheets of this map are of the most elaborate character. If it was desired to shield it from popularity by making it inaccessible and outrageously expensive better arrangements than those existing could not have been devised for the purpose. Delays, mistakes, unexpected charges, and expenses of the most irritating kind frequently happen even to the experienced purchaser of these maps. Some of these difficulties arise from the parochial character which is more or less common to all the maps of the Ordnance Survey, but most of them from the indexes which in the case of this map particularly are models of everything that an index should not be. They differ in style in different parts of the country; they are confused, too limited, or too complicated, and all costly and difficult to obtain. I am aware that the Committee of 1892 recommended a new style of index for the 25in. map, and that the Board of Agriculture adopted the recommendation; but I am now discussing the present difficulties of sale and distribution. These will at first be only increased by another addition to the already very large family of indexes, and one which, it may be observed, is to be another local and not a general index, and which, judging from the past history of the Survey, will probably not be completed for the whole country under half a century.

In illustration of some of the difficulties, let it be supposed that the 25in. maps of a portion of the country about Llong Railway Station, near Mold, be required. The would-be purchaser goes on the 2nd of the month to the agent in Manchester. The agent, of course, has no index to the 25in. maps of a district so far away, and has no idea which of the various styles of 25in. index puzzles is employed for that county. He produces the official "catalogue of the maps, plans, and other publications of the Ordnance Survey of England and Wales," explains that the 25in. maps are listed under counties, and asks the would-be purchaser in what county is Llong situated. About this the would-be purchaser is not quite sure. Reference is then made by the agent to the index to the 1in. maps, and he looks up the 1in. sheet on which Mold is. Having thus satisfied themselves that Llong is in Flintshire, some two miles from Mold, the catalogue is again

resorted to. Llong does not appear in the list of parishes, and so the conclusion is drawn that the parish required is probably Mold. Opposite the name of Mold the following information is set down :

| County and Parish. | Sheets. Price of each, uncoloured, 2/6, or if with areas, 3/-.
Total No. Numerals and Prices of each, coloured. | | | Area Book. Each. |
|--------------------|--|---|--|------------------|
| | | | | |
| FLINTSHIRE. | | | | s. d. |
| Mold | 33 | XIII.—3 ; XVI.—3, 12 ; XVII.—9 ; 2s. 6d. each. IX.—14, 15, 16 ; XIII.—4, 7, 10, 16 ; XVI.—11 ; 3s. each. XIII.—11 ; XVI.—16 ; 3s. 6d. each. XIII.—2, 6, 12, 14, 15 ; XIV.—1, 9, 10, 13, 14 ; XVI.—4, 7, 8 ; XVII.—1, 2, 5 ; 4s. each. XIII.—8 ; XIV.—5, 6 ; 5s. each. | | 4 6 |

The gentle and slightly grotesque vein of humour which pervades so many of the publications of the Survey is here rather more conspicuous than usual. All that can be gathered from this jumble is that there are 33 maps in the Parish of Mold, and that some of them cost as much as 5s. each. The delightful prospect of paying a guinea or two for maps which he does not want discloses itself to the would-be purchaser, whilst to the agent there is the fear of offending a customer if he does not take back any maps which may be ordered by mistake. Ultimately it is decided by the agent and the would-be purchaser that the best course of procedure will be to send to the chief agent in London for "an index map to the $\frac{1}{2500}$ maps in the vicinity of Mold." The interview having probably occupied the best part of half-an-hour the would-be purchaser departs with the knowledge that if everything goes well he may have the index on the 4th and the maps on the 7th. On the 4th the index arrives ; it is an index which includes only the $\frac{1}{2500}$ maps embraced in an area covered by 1 sheet of the 6in. map, and does not include Llong ; that is, it is an index to 16 maps forming parts of 6 different parishes, no one of which is complete. The ordinary mind might expect that some indication would have been given of the number and position of the 25in. sheets required to complete these parishes ; if so he did not reckon with the fertility of the Ordnance Survey in inventing inexplicable indexes. On this *index to parish maps* is given a table of the 6in. maps required to complete each of the six parishes. It is hardly necessary to add that the index map being a bad reproduction of the confused lin. outline map is almost illegible. The would-be purchaser and agent however after a conference arrive at the conclusion that Llong is most likely in the Parish of Mold ; it is therefore decided to send for the other four indexes required to complete the key to the Ordnance Survey of that parish. On the 7th (assuming the 5th to be on Sunday) these four additional indexes come to hand. Each of these precious

marvels costs 2d., so that the would-be purchaser has already incurred an expenditure of 10d., and probably by this time of some bad language. By good luck Llong does happen to be in the parish of Mold, and the would-be purchaser at last finds that the sheets he requires are XIII—12; XIII—16; XIV—9, and XIV—13 of the Parish of Mold, in the county of Flint. On reference to the list he finds the prices of these sheets to be 4/-, 3/-, 3/-, and 2/6, or 12/6 together, but that they can be obtained uncoloured for 10/-. The agent tells him that if he orders them uncoloured he will incur the risk of at least three days' extra delay in obtaining them, as the chief agent has not always a stock of the uncoloured copies. As moreover the uncoloured map is an incomplete map the would-be purchaser decides to order the coloured, and if there is no hitch he obtains his maps on the 9th, or exactly one week from the time he determined to purchase them. And this is a simple case, a campaign, to obtain some productions of the Ordnance Survey, conducted by men with some knowledge of the difficulties and obstacles to be overcome.

16. Some other points very material in connection with the amount of sales of the 25in. maps which were brought before the committee of 1892 deserve consideration. One of the most important of them is the high price of coloured impressions. The committee recommended giving up the two forms coloured and uncoloured in which these maps are now published (but not always obtainable) and substituting one form with the buildings "cross-hatched," or "ruled," as in some of the town plans. This recommendation was adopted by the Board of Agriculture, but it will be very many years before the maps are generally available in the new form. In considering this question of sale and distribution it is the existing state of things with which we must deal and not the conditions which may prevail in the distant future. Now the price charged for the 25in. maps in urban districts is totally prohibitive. Of course, in towns there is not much use for the 25in. map, as it is too small for cadastral and municipal purposes, and too large for a hand map. It makes, however, a nice wall map, and if it could be purchased at a reasonable price doubtless there would be some sale for it. Occasionally the unsuspecting citizen, having heard the accuracy, beauty, and cheapness of the Ordnance Survey work so much extolled in official publications and inspired articles, orders a few sheets, and, when they are delivered finds a bill for so many guineas, and as the sheets are non-returnable there is nothing for it but to pay and look pleasant; but that citizen probably registers a vow never to have anything more to do with the Ordnance Survey.

High price of
25in. maps.

17. The map of Manchester on this scale costs about £12 12s. But to obtain this information considerable local knowledge is required, for if the inquirer expects to find the cost of the 25in. map of Manchester under the head of Manchester, he is very much mistaken. Unless he happens to know that most of the Manchester sheets are contained in sheet CIV. of the 6in. map, he must seek under Ardwick, Bradford, Broughton, Cheetham, Chorlton-upon-

Town maps on
the 25in. scale.

Medlock, Crumpsall, Failsworth, Gorton, Hulme, Manchester, Manchester and Withington, Moss Side, Moston, Pendleton, Reddish, Rusholme, Salford, and Stretford, and when he has done this collate the information and strike out duplicates.

The uncoloured impressions are useless to ordinary citizens, as it is impossible to discriminate between the houses and the enclosure about them, and they are only used by the professional classes because of the high price of the coloured form.

18. When this map was first undertaken it was published separately for each ecclesiastical parish and nothing outside its boundary appeared on the map. The sheets on the outskirts of each parish were only partially filled, so that if a plan of a district traversed by a parish boundary were required, no matter how small the area, sheets of the adjoining parishes had to be purchased to complete the map, although had the map been filled in the whole would have been on one sheet. In recent years a great deal has been done to remedy this defect, but there are still in stock many unfilled sheets. Some means should be devised for acquainting the agents in the country with the exact state of the maps in this respect. Less than twelve months ago I ordered some 25in. sheets, and when they came to hand I found, to my great annoyance and inconvenience, a blank space on the sheets just on the site of the works for which the maps were required. The sheets were ordered by the county numbers and not by parishes.

Civil and
Ecclesiastical
Parishes.

19. At the Inquiry of 1892, I drew attention to the fact that one class of index map to the 25in. sheets had upon it the Civil Parishes, whilst the sheets themselves bore the name of the Ecclesiastical Parish, as also did the official catalogue (see Mins. of Evidence 1465-75). In regard to the parishes named, Deane and Eccles, the blunders in the official catalogue have been since corrected. But the catalogue and the index maps are still inconsistent. In Lancashire the Civil Parish seems now to have been generally adopted both in the index map and in the catalogue; but in Cheshire the old muddle remains—for instance, the Civil Parish of Tintwistle appears on the index map, but in the catalogue Tintwistle does not appear at all, and the maps themselves are entitled Mottram-in-Longdendale.

20. The index referred to above is that called "Index to the Ordnance Survey of (Lancashire or other County) showing Civil Parishes." It bears the sheet lines of three series of maps, viz.: The new 1in., 6in., and 25in. If it were only properly executed it would be the most generally useful of all the indexes. Even as it is, it is the one most frequently to be found at provincial agents, probably because it supplies more information at a less cost than any other, the price being twopence; and yet when looking at the official catalogue no one would ever suspect its existence, for it is hidden away as an item under the head of "List of Miscellaneous Publications of the Ordnance Survey," at the end of that publication. Before passing away from the 25in. maps, it will be well to draw attention to a note on page 2 of the official catalogue. "Sections of some sheets have hitherto been shown by the indexes

to have been printed on others. In order to obtain these sections, the numerals should be quoted, not those of the sheets upon which the indexes exhibit them as printed. Where sheets are so combined the numbers relating to them are bracketed together in the catalogue; an explanation which cannot be called luminous.

21. As we come lower in the scale of maps, the provision of clear key or index maps is naturally very much easier, but the Ordnance Survey, with that imperturbable satisfaction with everything it does will never produce a clear index. This is how it treats the subject of "County Index Maps" in the official catalogue: "Index maps showing the contents of each sheet on the $\frac{1}{25000}$ and $\frac{1}{10580}$ scales except those marked*, which show the contents of the sheets on the six inch scale; and those marked† show the plans on the scale of 25·344 inches to one mile ($\frac{1}{25000}$) only."

22. Most of the county indexes are ridiculously expensive. According to the catalogue, in addition to the county indexes, there are for some of the counties diagrams, but what the difference is between the county "index" and the county "diagram" is not explained. The list of sheets is prefaced by a map, which is entitled "Index to the Ordnance Maps of England, published on the scale of six inches to the mile." The attention of those who are not yet convinced of the exuberant energy in the production of the useless displayed by the Ordnance Survey may be commended to this small map facing page 21.

23. The numerous changes in form and differences in style in the 6in. maps which have occurred since its commencement and are still being made, undoubtedly prejudice the sales. Some of these changes seem to have been made without considering their effect at all. The Survey is ever experimenting at the expense of the public. One conspicuous instance is the frequent changes in the methods of showing buildings, a matter which should have been determined previous to the commencement of publication of each kind of map, and the method then determined upon adhered to throughout. Instead of which we find (Minute of Board of Agriculture, p. 11) that the Ordnance Survey is still experimenting on this very elementary detail of cartography. Customers do not understand these changes and return the maps complaining that the sheets do not harmonise with others which they already possess.

24. It is, therefore, a prime necessity that agents should be acquainted with these differences and the more or less inadequate reasons for them, so that they may explain to their customers where they occur, the probable cost of any given area of map desired, and the possibility or impossibility of making a harmonious map of a particular district.

25. The 6in. maps are published in two distinct forms—first the engraved full sheets of which there are two varieties, namely (a) direct from the copper, and (b) from transfers to zinc. The second is the quarter sheet photo-zincograph, of which the variety is enormous—so great indeed that it would seem as if the Ordnance Survey had wished to make every sheet different.

The meridian
and sheet line
jumble.

26. If a customer is anxious to have a few sheets of Derbyshire, for example, he will meet with three or four different qualities of paper, three different styles of contouring, three different styles of showing buildings. Owing to the mistake made in the early days of the Survey by plotting the counties to different meridians, and to the blunder by which the east and west sheet lines of contiguous counties were not made continuous, the maps of one county can never be made to satisfactorily join up with those of another. It is, therefore, impossible to obtain a satisfactory map of any district which lies in more than one county. For example the making of a map of the following rivers—the Goyt, the Mersey, the Irwell, and the Tame—presents insuperable difficulties.

Partly blank
sheets.

27. The great inconvenience and expense are aggravated by these boundary sheets being only partly filled. This was one of the points upon which I dwelt very strongly in my evidence to the committee of 1892. In their report on this head the committee says: "The great inconvenience, however, that arises from the irregular boundaries of parishes, and of counties being the boundaries of maps included in a rectangular sheet of paper, has of recent years led to a change of practice. The sheets are now wholly filled up with the geographical detail included within the area of the sheet, irrespective of where the county and parish boundaries fall." The true state of the case in this matter is shown by the two sample $\frac{1}{4}$ sheets sent with this report, which are of the new Survey of Lancashire only published last year ($\frac{1}{4}$ sheets CXII. N.E. and S.W.) Of the sheets included in the accompanying tracing* I only know of one which is so filled in, and that is Derbyshire, No. 5, N.W., which is the sheet produced, as evidence of the new practice, at the Inquiry of 1892.

Sheet lines in
neighbourhood
of Manchester.

28. The accompanying tracing* also shows the fearful confusion of sheet lines and maps in this neighbourhood. The agent should thoroughly understand this puzzle, and be able to inform his customers of the cost of completing any particular sheet. Take for example sheet 4 of Cheshire, costing 2s. 6d. After having first taken care that he is not put off with a rough zincograph, he will find that to complete this sheet two sheets of Yorkshire are required; the purchaser can have his choice of the old engraved, or the new $\frac{1}{4}$ sheets of that county. If he prefers the old engraved sheets as harmonising best with the engraved sheet of Cheshire, they will cost him 5s., or if the $\frac{1}{4}$ sheets be selected, two at 1s. = 2s.; then for the Southern portion he must obtain no less than five $\frac{1}{4}$ sheets of Derbyshire, costing 5s., that is to say for a complete sheet he must pay at least 9s. 6d., and may be charged 12s. 6d. There is another trap which the agent or purchaser may fall into in selecting the Derbyshire sheets; it may be assumed that the northern $\frac{1}{4}$ sheets of No. 1, Derbyshire, would be those abutting on the south edge of Cheshire, but of course it is nothing of the kind; it is the two southern $\frac{1}{4}$ sheets of the Derbyshire map which are required, the northern sheets having no existence except in imagination.

* The tracing referred to may be seen in the Society's Library.

29. The customer seldom understands why it is that the $\frac{1}{4}$ sheet has come into existence, and still less does he understand, in Lancashire particularly, where he has been accustomed to the beautiful engraved maps in full sheets, why he should have to pay 60 per cent more for a greatly inferior map. That it is inferior, and inferior in many ways other than those necessitated by the new method of production, there can be no manner of doubt. It might have been anticipated that in this and the neighbouring county of Yorkshire care would have been taken to make the photo-zincographic sheets as perfect as possible, because they have to stand comparison with the productions of the Survey at its very best period; but, on the contrary, the new maps are the most careless productions in the shape of permanent maps to which the Survey has yet descended. The method of hatching the buildings is slovenly in the extreme, and, moreover, is sometimes not of the same character on two adjoining $\frac{1}{4}$ sheets. The contouring is all but invisible, and its characterisation, so beautifully done on the old sheets, is completely lost. The sheets, too, are published practically without that elementary necessity for the use of maps, a proper scale. In some recent cases I have had to purchase the old map in order to interpret the new. Under these circumstances it will be necessary for the agent to inquire the purpose for which his customer wants the maps, in order that those may be obtained best suited to the intended use.

The 6-inch quarter sheet.

30. In ordering the 6in. maps by post the mistakes and misunderstandings are of frequent occurrence. The customer possesses, say, some $\frac{1}{4}$ sheets, for which he has paid 1s. each. He wants a map on the 6in. scale of some other spot, and remits to the agent 1s., plus postage. The agent has to inform him that the map he desires is a full sheet, and the price 2s. 6d. Again, a customer may require a sheet of the 6in. map, and not being aware that it is, in this case, published in four $\frac{1}{4}$ sheets and not a whole sheet, remit 2s. 6d. instead of 4s.

31. Even with the 1in. map, the one which is recognised by the public as the Ordnance Survey, there are a great number of points with which the agent should be acquainted if he is to satisfy his customers and promote the sale of the maps. In the first place, he should thoroughly grasp to what portions of the kingdom the old 1in. hill-engraved map extends, and that it is in some places in whole sheets and sometimes in $\frac{1}{4}$ sheets. He should know the particular sheets the plates for which have become so worn that the maps are unreadable. He should know that the hill-shaded map of the northern portion of England, down to the line Preston—Leeds—Hull, is the same map both in the old and new series, only that the numbers on the sheets have been changed, though in many cases the *old* numbers are on the geologically coloured sheets.

The one-inch maps.

32. He should know that the new series is published in many forms, and that it is not only a new series but a new map south of the line Preston—Leeds—Hull, and the forms in which it is published are outline advanced, outline engraved, and in some cases

outline in colour, contours in red, advanced addition with hills, in different colours and in different methods of shading, and finally he should know that in some districts no good map on the lin. scale is to be obtained in any shape or form. The central portion of Cheshire will serve for an example of the latter.

33. He should also be aware that these maps are not now produced from the original plate, but from electrotypes, and that because the survey is publishing sheets that are unreadable that that is no evidence that the original plates are absolutely worthless. For instance, in 1890 I drew attention to the fact that sheet 38 (Ambleside) had become so worn that it was extremely difficult to read, and looked very badly in juxtaposition with the other sheets of the Lake District. I attributed this to the great demand for the map in the years after it was first published; I thought the plates had become worn before the present method of printing was adopted. Sir Charles Wilson said that I was perfectly right in this, and that the plates would eventually have to be re-engraved, but this could not be taken in hand until the new map of the South of England had been finished. Two years afterwards I purchased of the Manchester agent a copy of the same sheet, which, if not equal to the early impressions between 1865 and 1870, is at least an enormous improvement upon the best which Mr. Stanford could get for me to illustrate my paper of 1890. This shows clearly enough that the Survey will go on printing worthless impressions of maps while all the time it possesses the materials from which to print good ones.

34. The public will not learn to appreciate cartography unless they are educated by the production of good work, and it is essential that any one purchasing parts of the lin. survey, which ought to be the great standard topographical map of the country, must have some assurance that the sheets which he purchases shall be of the same style and in reasonable harmony with surrounding sheets both as to date and style.

35. The indexing of the lin. map in a method which could be understood by the public ought not to be difficult, but as the sheet lines of the old and the new Surveys do not correspond, and as the old Survey can only be obtained in the hill-shaded form and a large portion of the new Survey only in outline, the purchaser does not always understand that if he requires a hill-shaded map it has different boundaries and must be ordered by different numbers from the outline map. For instance, the sheet Chester, 109 in the new Survey outline, has no exactly corresponding sheet in the old Survey, but part of the area is covered by the south-western $\frac{1}{4}$ sheet of No. 80 of the old Survey hill-shaded.

36. In the official catalogue we are told that, with certain exceptions, the hill-shaded sheets on the new Survey can be obtained with hills in brown or black. If the customer should order maps with hills in brown, the agent must be careful to see that the order does not contain any of those numbers which are published in black only.

37. The difficulties attending the sale and distribution of Ordnance Survey Maps are by no means exhausted in the above description, but it will serve as a sample of the nature of those which have to be dealt with in solving the problem of agency. It is obvious, I think, that the difficulties arise much more from the character and quality of the goods to be sold, and the absence of proper indexes and explanatory descriptions, than from the system of agency. No mere change of agency will place the public in any better position than it is now, however much it may affect the agents themselves.

38. But it may be as well to consider one or two of the schemes of sale and distribution which have been put forward. Sir Charles Wilson proposed to the Committee of 1892 to utilize the post offices by a scheme which, he said, "would work easily, without much trouble to the Post Office, and with certainly no more trouble to us than there is now" (Minutes of Evidence, 1892, qq. 5893). The scheme was thus described by him: "My proposal with regard to the Post Office was that one of these 25in. indexes should be put up in the Post Office, in a prominent position, with the price stamped on each sheet. I would also have a specimen of the 25in. map of the locality immediately round the Post Office put up. That would advertise the maps; and, as regards sale, I made a calculation and found that at the present selling prices we could send a map by return of post, paying the postage and the cost of the cardboard tube, and still let the purchaser have it at exactly the same price that he now pays the agent. My suggestion was that the purchaser should buy a postal order covering the cost of the map, and that the postmaster should simply stamp the word 'maps' on the postal order. That would kill the postal order, and the purchaser would then put it into an envelope with a little form stating the number of the sheet that he required."

Post Office
agency scheme.

39. Why the scheme should be limited in its application to the 25in. maps is incomprehensible, but apart from that there are fatal objections. It violates the conditions laid down in paragraph 4 of this report as essential to a satisfactory system. The post offices could not possibly keep a stock of maps; therefore in a district situated at this distance from Southampton no map could be obtained in less than 64 hours, and it is highly probable that the time would be much greater. Then who is to educate postmasters in all the mysteries of sheet numerals, of the clashing of sheet lines of adjoining parishes, of coloured and uncoloured impressions, of sheets which are printed on other sheets, of civil and ecclesiastical parishes, of "cross hatching," "stippling," and "ruling," of ever varying prices, of the date of surveys, of "stamped" areas and area books, whether particular sheets have conventional signs explained upon their margins, or whether it is necessary to buy a sheet of characteristics to explain the map?

40. If it is proposed that the postmasters should undertake the sale of all classes of Ordnance Maps then they should possess similar extensive information in regard to the other maps according to their class, in which case it would seem to be necessary to

establish an Ordnance Map Training College for Postmasters, otherwise how are they to acquire all this information in a trade which is quite foreign to their proper business?

41. Other methods which have been suggested, both involving the abolition of the chief agent, are—(a) a Government *depôt* or wholesale shop in London; (b) the establishment of a *depôt* in connection with the office at Southampton, from which all agents both in London and the provinces would draw their supplies.

42. The first method was tried with disastrous results more than twenty years ago, and very soon abandoned. Why the second, which is practically the same scheme, should be any better it is not easy to see. There would be the additional disadvantage of the *depôt* being less centrally situated and consequently a longer time being taken in supplying any requirements or deficiencies in the stock of provincial agents. One of the advantages of the *depôt* in London, either that of a chief agent or an official *depôt*, is that maps might easily be made returnable if a mistake in an order had been made, provided they had not been rolled or folded. Subject to this condition whatever system of agency be determined upon maps should be made returnable by map-dealers or sub-agents in London. In the provinces it is no easy matter to overcome the difficulty so forcibly illustrated by Mr. Wyld; but the larger the amount of stock kept by any sub-agent the less will be the number of difficulties caused by mistakes in ordering. Sub-agents should therefore be encouraged to keep a considerable stock and a liberal allowance be made to them to cover damage by keeping and handling. They should also be refunded the value of all maps superseded by new editions, either in money or in copies of the new edition.

43. My experience of the existing chief agency has been satisfactory whenever I have been able to go personally to Mr. Stanford's establishment. It is when maps have to be ordered either by post from the chief agency in London, or through a provincial agent that so many mistakes occur, so that neither of these two methods would obviate in any way the existing difficulties. Any change in the provincial agencies would certainly at first largely increase the difficulties. The public would lose all the advantage it now derives from the knowledge and training acquired by the agents, for many of them have had a very long experience.

44. Owing to the enormous development and increase in the number and varieties of maps produced by the Survey, the conditions of the problem are much more complicated than they were 20 years ago, when Mr. Ayrton tried the experiment of an official *depôt* in London.

45. In conclusion, it is my emphatic opinion that it is not likely that a mere change of agency will have any effect in promoting the utilization and consequently greater sale of Ordnance Maps. The causes of the partial failure of our great national cartographical institution lie deeper. The blind self-idolatry which refuses to admit that any of its publications are not quite what

they ought to be must not be longer permitted. Steps must be taken to reduce the number of varieties and styles in maps, many of which are as unnecessary as they are useless, frequently being the result of trifling changes which destroy uniformity without any compensating advantage. Reforms which have been admitted to be necessary must be forthwith commenced in earnest. With a rational system of indexes (either supplied gratuitously, or at a nominal price) and a descriptive pamphlet to guide the agents and public through the difficulties, some of which have been instanced in this report, and with a chastened spirit at Southampton, it is possible that something may be done to redeem the character and consequently to popularise the productions of the Ordnance Survey.

I am, yours very truly,

HENRY T. CROOK.

Eli Sowerbutts, Esq., F.R.G.S.,
Secretary Manchester Geographical Society.

NEW BOOK.

TAFILET : THE NARRATIVE OF A JOURNEY OF EXPLORATION IN THE ATLAS MOUNTAINS AND THE OASES OF THE NORTH-WEST SAHARA. By WALTER B. HARRIS, F.R.G.S., Author of "A Journey through Yemen," &c., &c. With eight full page illustrations and thirty smaller ones, and a sketch map of Morocco and a detail map of the author's routes, and index. 386pp. Price 12s. Edinburgh and London : William Blackwood and Sons. 1895.

THIS volume records an adventurous and dangerous journey made by Mr. Harris from Morocco to Tafilet, a journey which might very easily have had for the writer a sad termination, if at Tafilet he had not met with the assistance of a Morocco official with the peculiarly Eastern name of "Maclean." It was owing to this commander of the Sultan's army that Mr. Harris was able to get back to Morocco. On the same journey, shortly afterwards, the Sultan lost a good many men from the hardness of the way, and he himself died shortly after returning to the city of Morocco.

The book makes an admirable continuation of the late Joseph Thomson's book on Morocco, and this book will be read with great pleasure.

The book is divided into thirteen chapters, and describes the journey and return through the Atlas, by Dads, Ul Turig, to Tafilet; proceedings at Tafilet; a description of the Sultan's Court and mode of tax-gathering; the return journey; death of the Sultan, and the accession of the new Sultan.

Mr. Harris has a facile pen, and he gives descriptions of the country and the wild scenes through which he passed to this little known part of the Sultan's dominions.

The book is well done, the type easy to read, and is most interesting.

For persons interested in Morocco matters, the details and descriptions in the book will have a most important bearing. It is most opportune.

Mr. Harris proved in his "Yemen" book his admirable facility for getting into a tight place and his equal ability to get out.

He was happy in this instance to meet with kindness from both the Sultan and "Kaid Maclean;" if he had not had their kindly help he would hardly have survived to tell the story. It will be a rare book to read as a winter's tale.

THE ELEMENTS OF MAP PROJECTION.

By Mr. J. HOWARD REED, Hon. Sec. ("Victorians").

[Addressed to the Members, on Monday, March 23rd, 1896.]

Syllabus:—Ancient Ideas Concerning the Earth: Hebrew, Phœnician, Greek, Hindoo. Views during the Middle-ages. The Globular Theory Propounded and Proved. Elementary Definitions concerning Lines of Latitude and Longitude. Various Projections: Gnomonic, Orthographic, Stereographic, Globular. Projections and Developments: Cylindrical, Mercator's, Plane-chart, Conical. Various Modifications: Bonne's, Flamsteed's, Ptolemy's, Homolographic. The Third Dimension: Contour-lines.

In the following paragraphs it is intended to describe, in a simple and popular manner, the general methods adopted for showing on a flat paper, with some approach to accuracy, the various portions of the earth's surface. The mathematics of the several problems will be avoided, as for ordinary purposes graphical representation is, doubtless, sufficient to illustrate the geometry of the subject.



ANCIENT IDEAS.

Before proceeding to deal with the various *Projections* and *Developments* used in mapping our earth, it may be of interest to consider, very briefly, some of the notions with regard to the world which prevailed among the ancients.

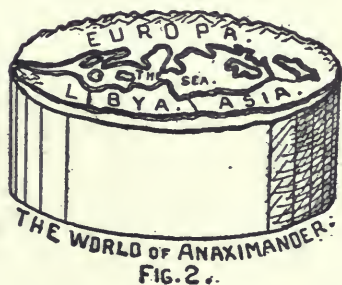
The Greeks of the time of Homer believed the earth to be a disc-shaped expanse of land (Fig. 1) surrounded on all sides by the ocean, which it was thought flowed as a river around it in a continuous stream. The word ocean (*okeanos*), we are told, meant to them literally a boundary, and is said to have been derived from a Hebrew-Phœnician root which, to the Phœnicians, signified a frontier, and was the name given by them to the sea which formed the western boundary of their country.

The Greeks looked upon the sky above as a material vault or dome supported upon pillars resting upon the outer shore of the ocean.

This idea undoubtedly prevailed among the Hebrews, and was probably derived from them. Job, for instance, says: "The pillars of heaven tremble."

In the story of Creation the firmament, or heaven, is spoken of as dividing the waters below from those which were above the firmament; and when the flood was poured upon the earth "the windows of heaven were opened." In Job also we read: "And seaeth up the stars," as though they shone through holes or windows in the firmament above.

The daily rising of the fiery sun in the east, after having apparently plunged into the western seas on the previous evening, was a phenomenon easily accounted for, by the ancients, by imagining a tunnel or passage-way beneath the earth, conveniently arranged for his accommodation. As observation showed that the place of his rising and setting varied considerably, according to the season of the year, something more than a mere passage-way was obviously required. To meet this necessity the whole earth was supposed to be supported on pillars arranged at intervals, leaving ample space for "Old Sol" to pass between and to choose where he should make his nightly subterranean journey. It is conceivable that it was this idea that was in the mind of the writer of the Book of Job when,



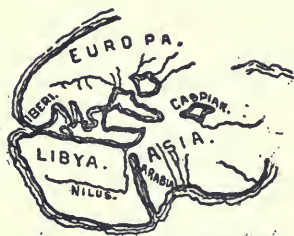
speaking of the earth, he says: "The pillars thereof tremble." At another time the sun was supposed to journey back to the east by passing behind some high mountains in the north.

The oldest school of Greek philosophers, the Ionian, founded by Thales, who is said to have been of Phœnician descent, taught that the heaven was not merely a dome, but a globe which surrounded the earth as a shell surrounds an egg. The earth itself was then considered to be a cylindrical or drum-shaped object, floating on the waters of the ocean, the upper face of which formed the habitable world. Anaximander, a disciple of Thales, varied this idea somewhat by propounding the theory of a drum-shaped earth (Fig. 2), with a height equal to one-third its diameter, floating freely in the vault of heaven.

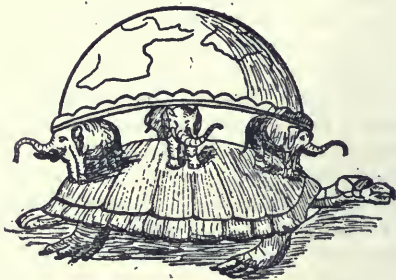
Anaximenes, of Miletus, the successor of Anaximander, thought the earth rested on compressed air, and was like a fish; probably meaning that as a fish floated in water, so the earth floated in the air.

Herodotus objected to the idea of the circumfluent ocean. He says, speaking of the Greeks: "The ocean they say, beginning from the sunrise, flows round the whole earth, but they do not prove it in fact." He appears never to have imagined the earth as a globe, and even speaks with derision of the prevailing idea of its being circular. "I smile," says he, "when I

see many persons describing the circumference of the earth, who have no sound reason to guide them; they describe the ocean flowing round the earth, which is made circular as if by a lathe." Fig. 3 indicates the idea of Herodotus.



WORLD OF HERODOTUS.
FIG. 3.

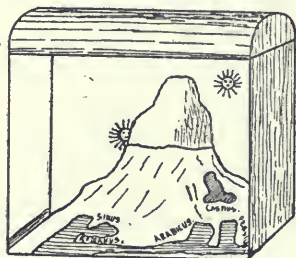


HINDOO EARTH.
FIG. 4.

The Hindoos allegorically regarded the earth as being of hemispherical shape, like an immense bowl turned upside down, and held up by four elephants (Fig. 4), which were in turn supported on the back of a huge tortoise which floated on a universal ocean.

VIEWS DURING THE MIDDLE AGES.

During the sixth century of our era, a work written in Greek and entitled "Christian Description of the Whole World" was produced by an unknown author, to whom has been given the name of Cosmas Indicopleustes. This writer, who by the way appears to have travelled both in India and Ceylon, regarded the earth as flat, of rectangular shape, with a length equal to twice its width. It is described as surrounded by the ocean which also flows in between the land in four places forming the Mediterranean and Caspian Seas, and the Arabian and Persian Gulfs. On



EARTH OF COSMAS INDICOPLEUSTES.
FIG. 5.



BEDE'S EARTH.
FIG. 6.

the four boundaries of the earth rise vertical enclosing walls, the whole being closed in above by the dome of heaven. The stars are supposed to be moved or carried about by angels, while the sun and moon set behind a high mountain. (See Fig. 5.)

The Venerable Bede, it is stated, looked upon the earth as resembling an egg. (Fig. 6.) The earth itself being in the centre represented the

yolk; the surrounding water took the place of the white; the atmosphere played the part of the membrane; while the whole was supposed to be surrounded by fire, which like the eggshell enclosed all.

THE GLOBULAR THEORY.

Notwithstanding the vague notions as to the shape of the earth which, as we have seen, were held not only by the ancients but by some of the writers of the middle-ages, and which no doubt still prevail among untutored peoples, the theory of the globular form of our planet was advanced at a very early age. Job's expression, "and hangeth the earth upon nothing" may even vaguely suggest the idea to our minds.

Plutarch, it is said, attributed to Thales the idea of the globular form of the earth, but Pythagoras, a philosopher of the sixth century, B.C., is supposed by others to have been the originator of the theory.

As time advanced the idea became more and more accepted. Aristotle refers to it, and advances as proof the fact that the earth's shadow, seen in eclipses of the moon, is always circular.

Eratosthenes, born 276, B.C., the celebrated geometrician and librarian, of Alexandria, believed the earth to be a sphere, and attempted to ascertain its circumference by the measurement of an arc of a great circle. Hipparchus, who lived a century later, was a supporter of the spherical idea, and was able to calculate the occurrence of eclipses. He established a method of projecting maps of the spherical earth upon a plane surface. Strabo, who died A.D. 26, also believed in the globular theory, and Claudius Ptolemy, the well-known Alexandrine geographer of the second century, not only recognised that the earth was a sphere but attempted to calculate its circumference, which he made about 20,500 miles.

According to Ptolemy the earth was supposed to be central and fixed, while the sun, moon, planets, and stars, revolved around her. This idea held the field all through the dark-ages, was taught by the Arabian geographers, and subscribed to by the philosophers who arose in Europe with the revival of learning in the middle-ages.

Early in the 16th century Copernicus advanced the true theory of the earth and its position as one of the planets in our system, and for the first time the sun became recognised as the centre around which all revolve.

It would be outside the scope of our subject to touch upon the work of Tycho Brahe, Kepler, Galileo, and Newton, except to remark that their researches and discoveries all helped to confirm and substantiate the revolution worked by Copernicus. The facts discovered and proved by these giants of science, however, were not easily grasped by the people, and sceptical ecclesiastics and others were always to be found who looked upon their theories as rank heresy. Galileo, it will be remembered, was compelled by the overpowering strength of the Inquisition to abjure the teaching he had supported.

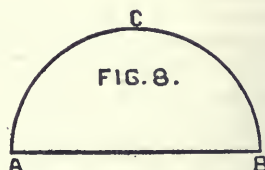
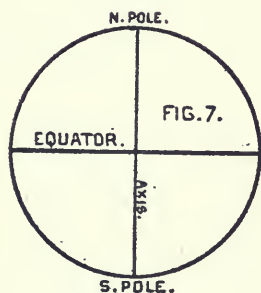
It is needless here to re-state in detail the well-known arguments which support and amply prove the well established and now almost universally accepted fact of the earth's approximate globular form. Let us, however, consider how such a body, or any portion of it, can be shown upon a flat surface with some approach to accuracy. It is at once obvious that absolute accuracy is quite impossible. This fact becomes apparent to anyone who

tries to flatten out the peel of a half-orange, or a portion of an indiarubber ball. It is immediately found that distortion or stretching of some portion is necessary. Flat maps, then, can only, at best, be approximations.

ELEMENTARY DEFINITIONS.

Before dealing with the various methods which are adopted in the projection of maps, it may, perhaps, be well if we fix in our minds some elementary facts or definitions which we shall have occasion to refer to as we proceed.

The earth, as is well known, possesses a spinning motion, from west to east, and completes one revolution every twenty-four hours. An imaginary line passing through the centre of the globe, forming the centre of motion, is known as the earth's *axis*, and this line we may take as the basis of a number of other imaginary lines which it is necessary for us to consider. The points upon the earth's surface, forming the ends of the axis, we know as the *poles*, and distinguish between them by calling them, respectively, the North pole and the South pole.



A line passing round the whole earth like a girdle, and so situated that every point is at an equal distance from both the poles, we call the *equator*. (Fig. 7.) This forms the base from which all *latitude* is measured, every place on the earth's surface being either to the north or the south of the equatorial line, unless it happens to fall upon the equator itself. As every circle is divided into 360 degrees, and as the distance of each pole from the equator equals a quarter of a circle, it follows that the poles themselves have a latitude of 90 degrees north and south respectively; every intermediate place having a definite north or south latitude between 0 degrees and 90 degrees, according to the angular position it bears to the plane of the equator.

The equator itself, being a circle, is divided into 360 equal parts, called degrees. Lines passing through these points of division, cutting the equator at right angles, form circles round the earth, each one of which passes through both poles. These are called *meridians*, and are used for fixing positions in degrees in an east or west direction, which we call *longitude*. The recognised zero from which we measure longitude in this country, as is well known, is the meridian passing through the Royal Observatory of Greenwich. The equator and each of the meridians are *great circles*, i.e., circles which cut

the globe into two equal portions, and every other circle which will do this is, also, spoken of as a great circle.

These imaginary lines, used for fixing latitude and longitude, form as it were a complete network over the surface of the whole earth. They enable us to fix the definite position of every point on the earth's surface in understandable and relative terms. In drawing flat maps it is necessary first of all to construct a network of lines upon the plane paper, which shall be similar, and approximate as nearly as possible, to those we have been considering in relation to a solid sphere. To accomplish this we adopt some method of either *Projection* or *Development*.

By *Projection* we understand the representation of the surface of a sphere on a plane according to the laws of *Perspective*. By *Development*, on the other hand, we understand the unrolling, or straightening out, of a cylinder, cone, or other shape, into which the whole or a portion of a sphere has first been supposed to have been converted. We shall proceed to describe some of these methods. The most satisfactory style for adoption depends very largely upon the position and magnitude of the portion of the earth's surface we wish to represent.

A projection may be drawn on the plane of the equator, the central line of sight being identical with the axis of the globe, with the pole as the central point. Such a delineation is known as a *Polar Projection*. If the plane of projection be that of meridian, the eye being supposed to be in the plane of the equator, with the equator crossing the map at the centre, the projection is called *Equatorial*. A map drawn on the plane of any other great circle, with the eye on the plane of any point between the equator and the pole, is known as a *Horizontal Projection*.

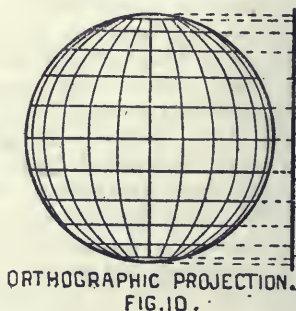
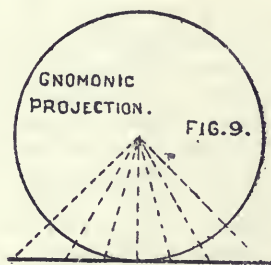
It is obvious that the larger the portion of the earth is, which is represented in one map, the greater the distortion or contraction becomes. This is especially marked in the maps of the eastern and western hemispheres which are often found in the early pages of our atlases. In these cases an attempt is made to represent in a circle equal to the earth's diameter (according to the scale of the map), no less than half the earth's surface. It is evident, therefore, that in doing this, we squeeze into a diameter a proportion of land and water spanned by half a circumference. As the circumference of a circle is about three-and-one-seventh times its diameter, it follows that such a map is distorted in the proportion of 11 to 7. That is to say, we show in a unit of distance (the diameter) a measure of land and water which really occupies one-half of three-and-one-seventh units (half the circumference) on the actual globe. This will be clearly apparent on reference to Fig. 8. The diameter of the map is shown by the line AB, but the actual distance on the earth's surface which it represents equals the curved line ACB.

Out of three needful conditions for a correct delineation of the earth's surface, only one, but either one, can be fulfilled in drawing a map on a plane. The correct angles may be maintained; the various distances, measured from the centre of the map, may be so arranged as to be true to scale; or, the areas may be made to remain unchanged. No two of these conditions, however, can be present at one and the same time.

In drawing maps of the hemispheres several methods of projection can be adopted. Any one of these may be used for the delineation of a polar, an equatorial, or a horizontal view.

GNOMONIC PROJECTION.

We will consider first of all what is known as *Central* or *Gnomonic Projection*, said to have been used by Thales in the sixth century, B.C. In this case the eye is supposed to be placed in the centre of the sphere (Fig. 9), while the objects on its surface to be represented are supposed to be seen on a plane which forms a tangent to the sphere itself. This projection is useful for polar maps, but it is too limited in its scope to be of service for hemispherical delineations. It is obvious, from the position of the eye on the same plane as the circumference, that the whole hemisphere cannot be shown. A complete map of the earth drawn on this principle would require six sheets, each of which would form one of the sides of a cube. All the great circles of the globe appear in this system as straight lines, and on this account the projection has been used for drawing charts for use in *Great Circle Sailing*. In polar maps (see Fig. 13), drawn by this method, the meridians show as straight lines radiating from the pole, while the parallels of latitude are concentric circles spaced at distances which increase in regular geometric proportion.



ORTHOGRAPHIC PROJECTION.

Another system, sometimes used for projections of the hemisphere, is known as *Orthographic Projection*. For this, it is said, we are indebted to Hipparchus. In this case (Fig. 10) the eye is supposed to be placed at an infinite distance from the sphere, and all lines of projection are therefore parallel—that is to say, the eye of the observer is supposed to be perpendicular to every point on the surface of the globe.

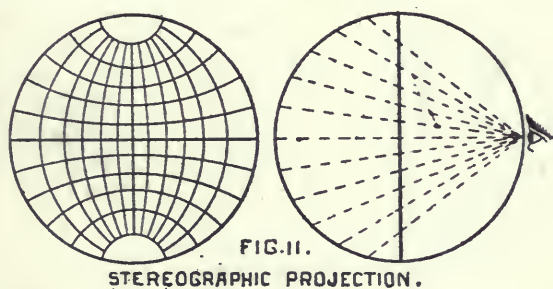
In an orthographic projection made on the plane of a meridian (an equatorial map), the equator and every other parallel of latitude appear as straight lines; while all the meridians, except the central one, which is straight, become portions of ellipses. It will be observed that by this system, although the centre of the map is fairly accurately represented, as we get further away from the centre distortion takes place, and increases in an accelerated degree as we approach the borders of the circle. The parallels of latitude get closer and closer together as we approach the poles, so that any feature of land or water upon the actual globe, towards the northern or southern extremes, would receive such a severe squeezing on the map as to be practically valueless as an indication of its relative size or shape. This will be perfectly apparent if we notice for a moment that although the distance between the 75th parallel and the

pole is exactly the same as that between the equator and the 15th degree on the globe, it appears on the map as a mere fraction, only, of that distance. The same thing applies, also, with regard to the meridians. As they recede from the central portion they become crowded closer and closer together until they almost fall one on top of the other. It is clearly apparent here, again, that any geographical feature would be shown edge or anglewise, and thus become so foreshortened as to lose all semblance to its real shape.

If orthographic projection is used for a polar map the meridians will be shown as straight lines radiating from the pole, like the spokes of a wheel. (See Fig. 13.) The parallels of latitude will appear as concentric circles which fall closer together as we approach the circumference, just as the meridians did in the former view. Features well within the Polar Circle, therefore, are delineated fairly accurately, but become much distorted as the lower latitudes are approached. The orthographic system does not conform to any of the three desirable conditions previously named.

STEREOGRAPHIC PROJECTION.

A third method adopted is known as *Stereographic Projection*. (Fig. 11.) For this, also, it is said we are indebted to Hipparchus. In this system



the eye is supposed to be placed at the surface of the sphere, and to view the features on the inner side of the opposite hemisphere as if through a transparent globe. The plane upon which the projection is received is supposed to be placed midway between the eye and the opposite point of the globe, at right angles to the central line of sight, being the plane of a meridian in an equatorial map, and that of the equator in a polar representation. In this system both the parallels of latitude and the meridians, in an equatorial map, are segments of circles; except in the case of the equator itself and of the central meridian, both of which are straight lines at right angles to each other.

The stereographic method has several advantages over the orthographic style just described, and it has in consequence been brought into more general use. In the first place, although the same total amount of contraction is of necessity present, as in any other map of a hemisphere, it is more evenly distributed, and is not specially concentrated in the circumferential area. Indeed the greatest squeezing in, in this case, is in the central portion of the map, while those features near the circumference are much more nearly of the correct area. This will be quite

apparent on reference to Fig. 11. Its construction, also, is simpler from the fact that, as above pointed out, the lines of both latitude and longitude are either portions of circles or straight lines. The parallels and meridians, too, in every case, cut one another at right angles, as they do on the globe itself. The first of the three needful conditions, previously mentioned, is thus fulfilled, because the angles remain the same and the similarity of shape of all areas is maintained.

In the case of a polar map, drawn on the stereographic principle (Fig. 13), the meridians, as in the orthographic system, form radii, with the pole as their centre; but the parallels of latitude are somewhat crowded together in the centre of the map, instead of at the extremities as in the last case. Those portions of the earth's surface, therefore, which fall near the exterior boundary can in consequence be more definitely and correctly delineated.

This projection is on the whole much more useful, not to say artistic, than either of the two methods previously dealt with.

GLOBULAR PROJECTION.

A fourth system known as *Globular Projection* is really a modification of the last named. It was first suggested by De Lahire, a celebrated French

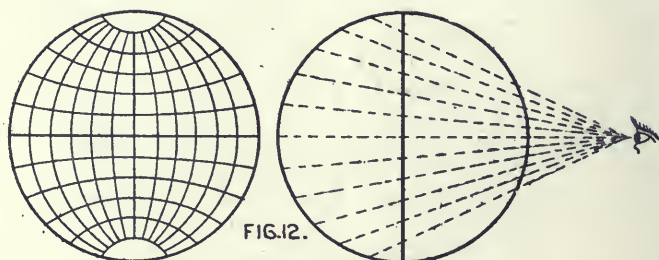


FIG. 12.
GLOBULAR PROJECTION.

geometrician of the 17th century. In this method the eye instead of being placed at the surface of the globe, as in the stereographic plan, is removed to a certain distance outside the circumscribing circle. (Fig. 12.) The originator fixed the distance of this point from the sphere as equal to the sine of 45 degrees. This distance has been modified to some extent by other authorities from time to time. It is now generally so arranged, in an equatorial map, as to equalize the distances apart of the meridians where they cut the equator, and of the parallels where they cut the central meridian.

In this projection the meridians become portions of ellipses, but they are so nearly circles that for all practical purposes they may be considered as such. Arcs of circles are therefore generally used in drawing maps on this system.

Polar maps of the globular type (Fig. 13) are, of course, very similar to those drawn by the stereographic method, but are improved by the fact that the parallels of latitude appear equidistant.

This equal division of the meridians and parallels in a globular map, makes it conform to the second condition laid down, viz., that distances measured from the centre of the map are true to scale. Moreover, areas which

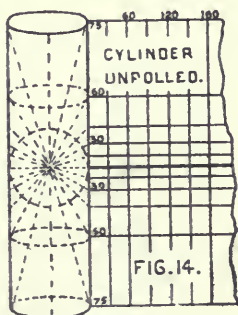
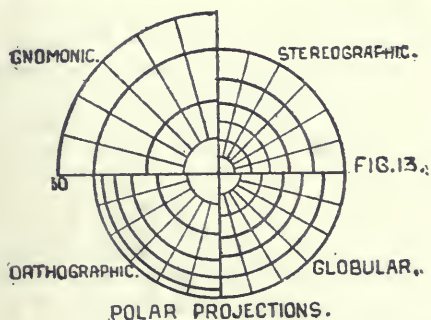
are equal to one another on the actual globe remain also equal, though reduced, when transferred by this system to the plane.

By placing the point of sight at a distance of half a radius outside the sphere some cartographers succeed in showing two-thirds of a sphere in a single map.

The globular method of projection is the one most generally adopted for drawing the hemispheres which usually form the frontispiece of an ordinary school atlas.

DEVELOPMENT.

We will now give some consideration to what is known as *Development*, and describe, briefly, some of the various systems which are adopted. As was stated in an earlier paragraph we mean by *Development* the unrolling, straightening, or spreading out flat, of some geometrical form, such as a cylinder or cone, upon which the lines of the globe have first been projected.



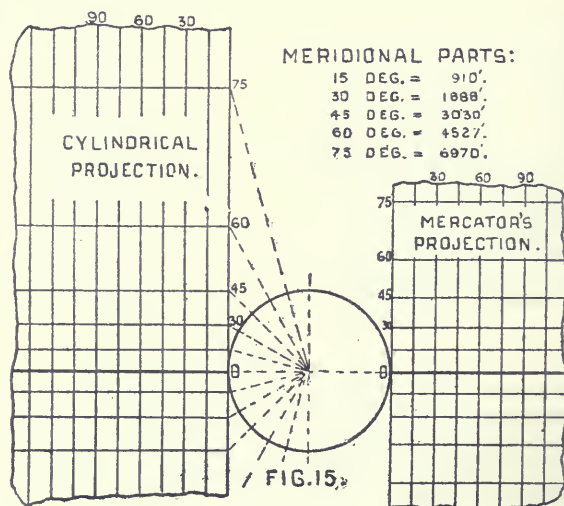
CENTRAL CYLINDRICAL PROJECTION.

One well-known method adopted is known as the *Central Cylindrical* system. In this case the globe is supposed to be enclosed by a cylinder, the sides of which are as tangents to the sphere. The point of sight is at the centre of the globe, while the visual rays radiate on all sides and, passing through the parallels and meridians, project them upon the enclosing cylinder, as shown in Fig. 14. If such a cylinder be then unrolled it will be found that the lines of both latitude and longitude take the form of straight lines, the former cutting the latter at right angles. Along the line of the equator, it will be seen, is the only portion of such a map which agrees with the dimensions of the actual globe. On the equatorial line the meridians are spaced at their true distances apart, but they maintain this width throughout their length, instead of gradually approaching one another, towards the poles, as they do on a sphere.

The parallels of latitude, on the other hand, get wider and wider apart as they recede from the equator. The poles or axial points, which on the globe are infinitely small, retain their infinitude by being infinitely distant in the cylindrical projection. It is, therefore, impossible to show the very high latitudes on a projection of this kind, unless we make the map of excessive and impracticable length from north to south, while, as we have already seen, it is quite impossible to show the actual poles at all. For all practical purposes,

however, every portion of the earth which we require to delineate, is situated, between, say, 80 degrees north and 60 degrees south latitude; and this fact enables this style of map to be usefully employed for many purposes. The districts in the lower latitudes, say within 20 degrees of the equator, are fairly accurately indicated, but the distortion and exaggeration increase enormously as we approach the poles. Such a map, therefore, is quite useless for any comparison of areas.

Maps of this kind are usually extended in length somewhat, from east to west, so that those portions which fall at the extreme ends may be duplicated on either end for ease of reference. Cylindrical projections are used for various purposes, such as for charts showing the direction of ocean currents, winds, and commercial highways; the distribution of climates, temperature, rainfall, plants, animals, races of mankind; and for indicating ocean depths, compass variations, etc. Such maps are not, usually, true cylindrical projections, but are suitable arbitrary modifications of that system.



MERCATOR'S PROJECTION.

The greatest value of cylindrical development is for purposes of navigation. Such charts are generally drawn upon a system known as *Mercator's Projection*, which is a special modification of the cylindrical projection just described. The two systems are often confounded by ordinary people, and the authors of at least two text-books have fallen into the same error. In Mercator's system the distance apart of the parallels of latitude increases in exactly the same proportion, as the poles are approached, as does the spacing of the meridians by their parallel arrangement. That is, in the proportion of the radius to the cosine of latitude. These distances can be readily obtained from a table of Meridional Parts, to be found in most volumes of mathematical tables. The diagram (Fig. 15) shows the proportion of a chart on the Mercator plan as compared with one on the true cylindrical projection.

Maps constructed on Mercator's method, like those stereographically drawn, maintain correct angles and similarity of shape of all areas; and thus conform to the first of the three needful conditions laid down.

The special value of Mercator's projection, for purposes of navigation, consists in the fact that any *loxodromic curve*, or *rumb line*, becomes a straight line upon such a map. And, *vice versâ*, any straight line drawn upon a Mercator chart, at an angle to both the meridians and parallels, is a rumb line upon a globe, and gives a continuous and definite compass direction throughout its length.

A rumb line is that which a navigator of necessity follows when steering his vessel by compass. Such a line upon a globe is a spiral, cutting all the meridians at the same angle, and continually approaching, but never reaching, the pole. It becomes a complicated curve difficult to lay down upon a chart drawn upon any other principle than Mercator's.

PLANE CHARTS.

Another style of cylindrical development, which was in use for nautical purposes previous to the introduction of Mercator's plan, and for some time afterwards, is known as the *Plane Chart*. In this the meridians and parallels are set off as equidistant and parallel lines at right angles to each other, forming by their intersection a series of squares, from which fact this system has been spoken of as *Square Projection*. A modification of this, which is a considerable improvement, is arranged by setting off the meridian distances as they actually are on the central parallels, 45 degrees, instead of on the equator, so that the lines of latitude and longitude, by their intersection, form rectangles in place of squares. Both of these systems are very crude and not of much value, the former being useful only in the immediate neighbourhood of the equator, say between 20 degrees north and 20 degrees south latitude; while the latter is, of course, only accurate at the parallels of 45 degrees. Both systems rapidly become distorted to the north and south of those places.

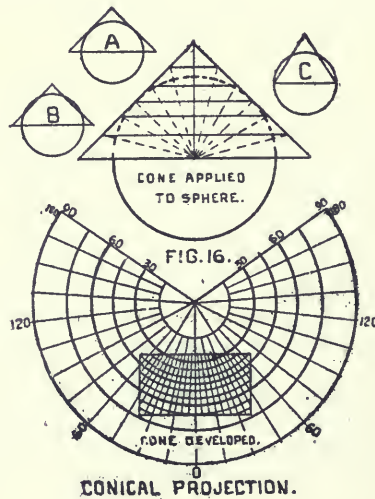
CONICAL PROJECTION.

In mapping portions of the earth's surface, what is known as *Conical Projection* is usually employed. In this system the globe, or some portion of it, is supposed to be circumscribed by a cone (Fig. 16). Upon this the various points are projected by lines running from the centre of the sphere, it being then developed or spread out, forming a plane map. The cone should be so arranged as to be tangential to the sphere at the point which it is desired to fix upon as the central parallel in the proposed map, as shown at A. In this projection all the meridians become straight lines, converging in the vertex of the cone. The parallels appear as concentric circles, each struck from the vertex as a centre.

It is evident that the only portion of a map on this projection which is accurate, is along that parallel where the circumscribing cone touches the surface of the sphere, all other portions being distorted in an increasing degree as they recede from the central parallel. This defect can be modified or equalised somewhat if a secant cone is adopted. That is, the cone on which the projection is developed is so arranged as to touch, or cut into, the surface of

the sphere in either one or two places as shown in B and C, Fig. 16. This system was used by Delisle, in the middle of last century, but is said to have been invented by Mercator two hundred years before. In such a case, the portion of the map between the two lines of accuracy will be distorted by being squeezed in, while those portions which lie beyond are enlarged, as in the previous instance. Maps in which this projection is used are usually of comparatively small portions of the surface of the globe, so that the distortion is not a very serious matter.

Various modifications of the conical system are adopted by chartographers for mapping different portions of the globe, with a view to reduce, as much as possible, the amount of distortion which would take place in a true conical projection.



APPROXIMATE CONICAL PROJECTION.

In one common method, frequently adopted (Fig. 17), the central meridian of the map is drawn as a straight line. Upon this are set off the parallels at equidistant intervals. From the vertex* of the cone as a centre the parallels are then drawn, forming portions of concentric circles. Along two of these lines, one near the top and the other near the bottom of the proposed map, are then set off the true meridian distances taken from a calculated table. The points thus found are connected by straight lines, and the projection is complete. The errors inseparable from a plane map are by this means distributed over the whole surface, and rendered unimportant. A projection of this kind is very suitable for a map of a small area, such as Great Britain, and leaves very little to be desired.

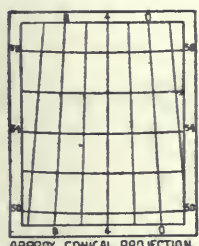
* To obtain this point, extend the central meridian; then, from the point of intersection of the middle parallel, mark off upon it 57.3 degrees, to the scale of the map to be drawn. This distance equals the radius of the sphere of which the proposed map forms part. The height of the vertex of the required cone equals this radius multiplied by the cotangent of the middle latitude of the map.

BONNE'S PROJECTION.

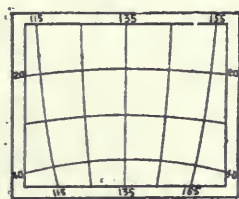
A second modification is somewhat similar to that just described. In this case the parallels are also drawn as concentric circles, with the apex of the cone as a centre, the central meridian again appearing as a straight line. The meridian distances are then measured off at their true distance on each of the lines of the latitude, and curved lines, arranged to pass through all of these points, then form the other meridians. This system (Fig. 18) is sometimes spoken of as *Bonne's Projection*, but it is said to have been invented by Mercator. It was also used during the middle of last century by both Delisle and D'Anville. It conforms to the third of the needful conditions laid down in being equivalent, or maintaining the areas unchanged. This projection is much used for such maps as Europe, North America, or Australia.

FLAMSTEED'S PROJECTION.

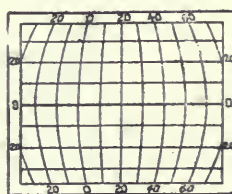
What is known as *Flamsteed's Projection* (Fig. 19) is believed to have been invented by Nicholas Sanson, a celebrated French geographer and chartographer of the 17th century. It was used by Flamsteed for the projection of star maps. In this system all the parallels of latitude appear as



APPROX. CONICAL PROJECTION.
FIG. 17.



BONNE'S PROJECTION.
FIG. 18.



FLAMSTEED'S PROJECTION.
FIG. 19.

straight lines, spaced at equal distances apart. The meridians are spaced off at their true magnitudes along each of the parallels, and thus appear as curved lines. This projection is very suitable for maps embracing portions of the equatorial regions, and is much used for delineations of Africa and similar districts; it, also, maintains equivalence of areas.

PTOLEMY'S PROJECTION.

Flamsteed's system is in reality an improvement upon a crude projection used during the second century by Ptolemy. The Alexandrian geographer arranged his parallels as straight lines, but his meridians were only spaced off along two of the parallels, situated, one near the top and the other near the bottom of the map, and along the equator. These points were joined together by straight lines; the central meridian, only, was at right angles to the parallels.

HOMOLOGRAPHIC PROJECTION.

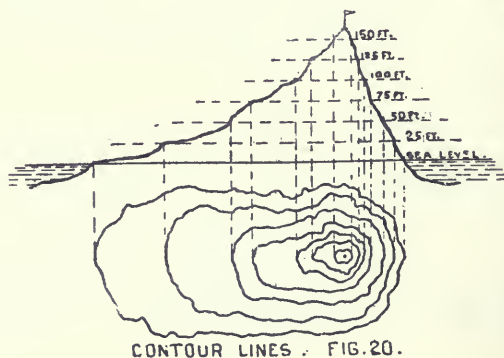
What is known as *Homolographic Projection*, Mollweide's system, represents the entire earth in the form of an ellipse. The long or major axis is the equator, while the short or minor axis forms the central meridian.

All the parallels of latitude are shown as straight lines, so spaced as to secure equal areas, while the other meridians are ellipses. Maps on this projection are very seldom drawn, and answer a fanciful rather than a useful purpose.

CONTOUR LINES.

Having dealt at some length with the various methods by means of which portions of the sphere, or the whole globe, may be represented upon a plane surface, it may be of interest to glance briefly at another matter, which is all important in plano-representations of the surface of our earth. All that has been said in the foregoing paragraphs has dealt with the delineation of the surface of the globe on a plane, but after all everything has been left at a dead level. A word or two, therefore, on the methods adopted for representing the third dimension may not be out of place.

All heights of land surfaces, or depths of sea bottoms, which represent the two extremes of the third dimension referred to, are measured from the



average sea level. This, therefore, forms a base line, or starting point, as it were, and is at once fixed on any map as soon as the outlines of continents, islands, or other land areas, are drawn upon it.

Heights of land above the sea level can be readily shown upon a plane surface by what are known as *Contour Lines* (Fig. 20). These are lines drawn upon the map round any mountainous or rising ground at definite heights of, say, ten, twenty-five, fifty, one hundred, or one thousand feet, as the case may be, according to the type of country to be represented, or the scale of the map to be drawn. A succession of such contour lines, arranged at regular intervals, shows at once, not only the height of the land at a given place, but, also, when viewed as a whole, gives a definite idea of the angle of its slope, and shows at a glance whether it is steep or gradual.

The marks, the result of the ebb and flow of the tide, on a sea shore afford an excellent illustration of what is understood as a contour line. The line of seaweed, or other refuse, left on the shore by the receding tide, or even the wet mark it leaves behind it, forms at once for us a natural contour line. If we could imagine the tide to so flow in upon the land as to rise to ten, fifty, or one hundred feet above

its normal level, leaving at each height reached a definite mark, a series of natural contour lines would be drawn around the features of the landscape. As, however, the sea is not usually so accommodating as this, it is necessary to resort to other means. For this purpose, therefore, observations are made and levels taken by surveyors, and these, when transferred to the map, form at once an index to the character of the slope which exists. Where the contour lines fall close together it proves that the land at that place is proportionally steep, while, on the other hand, where they are spaced widely apart, it is as easily known that the slope in question is a gradual one. This will be quite clear on reference to Fig. 20. It is manifest that ocean depths can just as readily be indicated by contour lines.

In the foregoing paragraphs no attempt has been made to deal with geodetic questions, either of arc measurement, triangulation, or cadastral surveying; nor of the methods adopted for delineating in detail the various geographical forms and topographical features. The general practical work of chartography and map drawing, and the several methods of reproduction have, also, been left untouched. These branches of chartographical science, however, can scarcely be said to fall within the scope of a paper on the "Elements of Map Projection."

NEW BOOK.

IN HAUNTS OF WILD GAME: A HUNTER-NATURALIST'S WANDERINGS FROM KAHLAMBA TO LIBOMO. By FREDERICK VAUGHAN-KIRBY, F.Z.S. (Magagamba). With Portrait of the Author. Numerous (about 40) Illustrations. By C. WHYMPER, and a Map. William Blackwood and Sons, Edinburgh and London. 568 pp. Price 25s. 1896.

THIS is a handsome book, and is a pleasant book to read; it is divided into two main parts—the first, "Krantz and Kloof," where the shooting of reedbuck and small game, bush pig, bushbuck, koodoo, buffalo, leopard, and the hill leopards is minutely described, with considerable and interesting detail of a good many of these creatures.

The second part, "Bush-Veldt," describes in a similar way the hunting of the "wildebeeste," the sable antelope, giraffe, low country leopards, and lions, with some directions as to the selection of rifles, and useful hints for the hunter.

An appendix giving a comprehensive list of the fauna and the Kahlamba-Libombo hunting-veldt, and some notes of the formation and pronunciation of native words in the Swazi language, with an index, completes the book.

The illustrations are very good and some of them very beautiful.

The description of this East African district is many times very well done, and the work of the wild beast hunter, with its excitements and perils very graphically described.

Some of the beasts mentioned have already disappeared from the districts and all will do so as settlement progresses.

The effect of the book on the mind is sad. These creatures are shot, not always killed, and it is with a sense of relief that we read of one or two escaping the hunter. Those who begin to read the book will not readily lay it down until the several chapters have been perused; and readers will remember that Mr. Kirby is one of the merciful hunters of these interesting and beautiful creatures.

"UNIFICATION OF TIME" AS IT RELATES TO THE PRACTICE OF THE SCIENCE OF NAVIGATION.

BY W. NELSON GREENWOOD, F.I.Inst., F.R. Met. Soc., &c., Master Mariner.

[Read to the Members, Wednesday, December 18th, 1895.]

To the uninitiated and, indeed, to many of the initiated also, it may seem strange that there should be anything in common between the question of Unification of Time, as generally understood, and the practice of the Science of Navigation, or as to how the seaman, who pursues his occupation in deep water, can possibly be interested one way or the other in our method of recording, or under what nomenclature we may choose to designate the hours of the day. Of what possible interest can it be to the sailor if we on shore elect to say the fifteenth hour of the day in place of three p.m., or choose to make the hours continuous—one to twenty-four—from midnight to midnight, in place of dividing the day into two portions of twelve hours each? What does it matter to, or how can it possibly concern, the mariner which way the time is kept over central Europe, or on the heights of the Rocky Mountains; he has no journey to make by rail, nor has he any railway time-table to consult. Once the open sea is reached, time, hours, and dates are thrown to the winds, and resorting to his "watch and watch" the sailor makes his own eight strokes on the bell do duty for the hours of the day, leaving the hours o'clock to those who stay on shore. Having already divided the twenty-four hours of the day into six periods of four hours each and distinguished them after his own fashion by strokes on the bell, the odd strokes for the half-hours and the even strokes for the hours; one to eight strokes struck two and two together with a slightly longer interval between each second stroke; eight strokes fill up his time period, and "three," "six," or "eight bells," as the case may be is all he wants or cares to know about the fleeting hours, until he steps on shore again. If he only keep count of the days as they pass so as not to lose the date and the month, even if it be like Robinson Crusoe on his island, a short notch on a sapling for the working day and a longer one for the Sunday, he is all right, and will find on his return to shore date and time going on much as he left it.

This is the accepted idea, and even the seaman himself does not generally look at the question of unification of time in a much more serious light. Having by training and long practice become accustomed to the incongruity of our present system of time reckoning, he considers it part of his duty to accept things as they are, never questioning himself or others as to the possibility of our forming a better or more comprehensive system of keeping time. He looks with surprise at the landsman who asks the meaning of the "bells," in their relation to the hours of the day, or says that he does not understand nautical time, presuming in his innocence or, may be, want of thought, that all are as well acquainted with time changes and the manipulation of dates,

days, and hours as he is himself. Having accepted his science ready made, he thinks what is is necessarily of the best ; and having daily rung the changes on date and hour, possibly for years, he finds no cause for jubilation in the fact that he has at his fingers' ends, as it were, a transposition of figures puzzling in the extreme, and attaches no importance to the question of unification of time when it is brought before him ; not from a real want of interest in the inquiry, but from want of leisure to study the proposed changes and some one to express publicly his ideas on the subject. It will be my duty to show, as clearly as may be within my power, that of all the people interested in the change, be it one universal prime meridian for all maritime nations, or one universal method of time reckoning, his is the greatest interest, and his voice should be the most distinctly heard ; for his profession as a navigator will receive the greatest benefits from the change proposed when it becomes an established fact.

Presently we have in use three methods of recording time and three separate days, all of the one date to record it in—the Astronomical day reckoned in the twenty-four hours system, from noon of the one day to noon of the following day ; the Civil day, commencing at midnight and ending at midnight, divided into two twelve-hour periods known as a.m. and p.m., or before and after the noon that commenced the Astronomical day ; the Nautical day, sometimes reckoned in the twenty-four hour system, more frequently divided into two periods of twelve hours, ending at noon of the Civil day, or where the Astronomical day commences, the p.m. forming the first half, the a.m. the latter half of the day. How they came to be known as Astronomical, Civil, and Nautical days is perfectly clear ; how they come to differ so much as twenty-four hours in period, or why it should take forty-eight hours to run through one particular date or day of the month, when referred to all three days, is not so evident without a little closer examination.

Taking the civil day first the conclusion is obvious, that the mid-sun or mid-day, the half-way house, or middle period of rest in the labours of the day, the hour devoted to rest and refreshment by the toiler before he finished with the setting-sun his allotted task, determined his day, and working backwards and forwards from this middle starting point, he naturally extended it to midnight ; thus ending a day that was perforce followed by the commencement of a new date. To the astronomer working during midnight hours this civil method of recording the days had its disadvantages ; a break in the midst of his labours was not convenient to him ; he was not so much concerned with the high noon as with the high midnight. The sun was not a very constant time-keeper when compared with the starry heavens ; and whilst the uneven motion of the sun, as he progressed from the equator towards the solstices and back again towards the equator, was of little account to the toiler in determining the length of his time periods, it was of paramount importance to the astronomer that he should find in the stars a surer guide to the true division of the day, and naturally, as the husbandman had done before him, he made the high midnight of his labours the middle of his astronomical or starry day ; thus commencing his diurnal time division at the high noon of the toiler. With the navigator circumstances were entirely different. Having committed himself to the watery waste of ocean embarked on his enterprise of commerce or discovery, the land behind, the open sea in front, excepting the date of his departure and the last point of land in view from his good ship's deck, midnight or mid-day had no interest for him ; his object was to reach the haven for which he steered as quickly as possible. Days and dates, excepting as to the time occupied on the voyage, counted as nothing ; and yet one thing was necessary, he must keep some account of the progress made and determine his position every available opportunity. The sun served him for this purpose, and high noon was the proper time. How far had he sailed since last he saw the land, or last the sun at mid-

day gave him his position? This was the finger-post that guided him, and naturally the newly-found position on the trackless ocean concluded the old whilst it commenced the new day. Thus may we roughly trace how, in his own particular line, the civilian, the astronomer, and the navigator, each made his own convenience serve him as to the day, resulting in a time period peculiar to himself alone, and which at a particular hour agreed with the other days as to the date, but had nothing in common as to the hour throughout.

To change all this, and from a commercial as well as a geographical point of view, form a common basis for the commencement and ending of these several unscientific and conflicting days, which have now become obsolete, is the object of this paper. And now that science has become the handmaid of industry, and geographical knowledge combined with mechanical skill laid the world at our feet; whilst astronomy, even in its higher branches, accompanied by mathematics is imported daily more and more into the science of navigation, the civil, astronomical, and nautical days have lost the technical interest that formerly centred in them, and no greater tribute to the intelligence and unanimity of public opinion as it relates to the well-being of all in the closing days of the 19th century can be found, than that which is put forward in the proposition that we adopt, along with other nations, or even failing them, unification of time as understood by the four following questions:—

UNIFICATION OF TIME.

1. Are you in favour of the Greenwich meridian being universally recognised as the prime or first meridian by all maritime nations?
2. Are you in favour of the Unification of Time as reckoned from such prime meridian, and extended to all nations irrespectively?
3. Are you in favour of the Unification of Time as applied to the civil, nautical, and astronomical days, and is it desirable in the interest of all concerned that such days should each commence at Greenwich mean midnight?
4. Are you in favour of reckoning the day by the 24 hours system, counting the hours for each civil, nautical, and astronomical day from 0, or mean midnight, at Greenwich throughout the 24 hours to midnight again? This will do away with the old a.m. and p.m., but will make mean noon at Greenwich the 12th hour for all three systems of time-reckoning alike?

In the good old days, and before science had as yet sought the haunts of men, 1760 or thereabouts, and before John Harrison had completed his first chronometer, showing that it was possible to construct a time instrument that would go correctly under various and even unfavourable circumstances, much of the art of navigation as to longitude east and west of the first meridian, or to state it more correctly, the meridian of the Lizard Point in the English Channel, was performed under ordinary circumstances by what sailors know as "dead reckoning;" corrected by the latitude determined by the daily observation of the sun at noon. Since John Harrison's day the chronometer, as a timekeeper, has been more and more perfected until we have now an instrument for navigating second only to the mariner's compass, and forming one of the principal instruments in the outfit of every ocean going vessel. Set to Greenwich mean time, or first meridian time, at the commencement of the voyage, it is supposed to maintain, by its uniform rate of going, the correct time at Greenwich under all circumstances, unless those of positive abuse, for any length of voyage. Having this knowledge supplied by the chronometer, the captain of a ship can by ascertaining astronomically the correct apparent solar time at the place of his

observation, and taking the difference between the two times—having first reduced his apparent time to mean time—find his longitude east or west of the first meridian in time, which, reduced to degrees and minutes, gives him the position of the ship in longitude east or west of Greenwich. To-day these instruments are made so perfect that very great reliance can be placed in them, and by using three or four of them and taking the mean of the whole, an approximation very near the truth is arrived at. Still they are only instruments and may go wrong ; so every opportunity of comparing them with some standard such as a time gun or ball at an observatory, or some sidereal, or astronomical clock is sought after by the careful commander, and such information is supplied daily by gun or ball at or near about noon at most of our home ports, and at many large ports abroad the information is given in mean time at place. There are other means of comparison, however, of which captains avail themselves, and passengers who have made long voyages may have noticed when nearing the land, if not at other times, an inclination on the part of the master and officers of the vessel to “speak,” or signal, some passing ship. Should one have been met with, the passengers will no doubt have noticed, further, that a more complicated system of signalling than is ordinarily employed is made use of, such as the hauling up or down of the national ensign on a signal being given by the captain or some officer stationed below to one on deck, and that the dropping of the flag is immediately followed by a similar action on board the “stranger.” What has taken place is an exchange of first meridian time, and is the answer to a signal previously made, such as, “I will exchange time with you,” or “Give me your first meridian, or Greenwich time.” But this exchange of time is not sufficient in itself ; it is further necessary that each should know to which first meridian, at present out of many, the time exchanged is to be referred. Wanting this latter information the time exchanged is useless. That this is a question of much importance to those interested may be easily gathered. That accidents of a serious nature to both life and property have occurred through misunderstanding the signals made is beyond doubt. As to the care required in using such information, particularly when obtained from a foreign vessel, the following incident experienced by the writer when navigating in the Pacific Ocean, will illustrate. By accident, or carelessness on the part of a subordinate, the navigating chronometer got disarranged and rendered useless, and recourse was taken to another, a much inferior instrument. Some few days afterwards a vessel was sighted and the opportunity taken to signal first meridian time. The national flag of the stranger could not be very distinctly made out, though the time signals were clear enough, and from the direction in which the two vessels were going, being on opposite tacks—or away from each other—combined with the rate at which they were sailing, it was not possible to obtain the meridian to which the time given by the stranger should be referred, before he was out of signalling distance. When the time received was worked out it showed a first meridian some 22 degrees east of Greenwich. On referring the time difference to the longitude of known observatories, or national meridians, it was not found to agree, even partially, with any other than that of Athens. As the stranger’s nationality was doubtful, it was concluded that he might be a Greek, but still the comparison of time gave an error of six minutes or one degree and a half of longitude when compared with the ship’s chronometer. It was possible the instrument might be out so much, but an error so great could not be admitted, or used with any degree of certainty ; therefore it was necessary to navigate with extra caution, particularly as we had to pass through and between various groups of low lying islands, before approaching the coast of North West America. On arrival at the port of destination, San Francisco, the ship’s chronometer was found to be fairly right, and the time given by the stranger all wrong, at least to the extent

of the six minutes referred to. As both vessels were bound to the same port, an opportunity was taken, some time afterwards, of paying a visit to the stranger and ascertaining to which meridian the time exchanged should be referred, when judge of my astonishment to find it was Honolulu or Sandwich Island mean time that had been given! Had one prime meridian, or universal time, or the twenty-four hour system been in use, such an error could not have occurred, for in the first case the same meridian would have been used, in the second the time signalled as Honolulu mean time would have been thirteen hours twenty-eight minutes, in place of one hour twenty-eight minutes, east of 0 hour, the prime meridian of Greenwich to which the time given was referred. Unification of time will remove this little difficulty, for no uniform system of time reckoning can be made international without the adoption of one prime meridian, be it that of Greenwich or some other national observatory.

This little personal experience in the life of a seaman is insignificant enough in itself, and would not be worthy of narration but for the fact that it perfectly illustrates the great importance, in the interest of life and property, of the point I would especially bring to your notice—namely, uniformity in mean or geographical time; and how necessary it is that the navigator should be able to obtain such information, if he requires it, without undue or unnecessary complications of first meridians and time. For any system of international, or non-international, time-keeping which permits of each individual navigator using just that prime meridian, or corresponding time, which best suits his own convenience, is liable to lead to nothing but complications and consequent mistakes in our intercourse with each other in matters of time as it relates to longitude. As the first duty of a shipmaster consists in taking his vessel as safely and as speedily from port to port as possible, his exact position, at least as near as it can be determined once a day, is of great importance to him, and every assistance that can be rendered him towards obtaining his object, either by advocating the unification of time or the adoption of one prime meridian, becomes the duty of every scientific society that claims to take an interest in navigation, or anything that appertains to the science thereof.

I think I have shown clearly that one starting point or first meridian from which to reckon time that has to be used in determining longitude is an essential that unification will supply, and all navigators will agree that uniformity of time, and the 24 hour system of reckoning it, has an important bearing on the interests of those who do business in deep water. There is another question in relation to this one prime meridian for all nations which is quite worthy of our consideration—How will the change affect the charts used by navigators? At present seventy-five per cent of the charts used in navigation, not only by our own countrymen but by foreigners frequenting our ports, are delineated, engraved, and printed in this country. Issued by the Hydrographic Department of the Admiralty and private cartographers, they are drawn principally from our own surveys. Of the remaining twenty-five per cent—the charts of other nations—it is doubtful if they are ever looked at by English seamen, unless in a case of absolute necessity, principally on account of the meridians to which they are drawn. Many of them good charts, a few quite superior ones, their disuse by our navigators is a loss to them, in many cases, of valuable information. Should one prime meridian, therefore, be adopted, and with it one natural scale for the delineation of all charts of whatever nationality, it can result in nothing but good, not only to ourselves but to navigators in general.

Let us now look at unification of time as understood by the civil, astronomical, and nautical days and the twenty-four hours system of recording them—how do they affect the navigator? The simplification of the science of astronomy as applied to navigation, the work issued by our Nautical Almanac Office yearly, coupled with a

good sextant and chronometer, have made navigation, so far as determining the ship's position at almost any hour of the day or night when sun, moon, or stars are visible, almost an easy problem to solve; but there still remains the incongruity of the twelve hours difference in recording the time of celestial phenomena astronomically and the hours of the civil day, and a corrective to that amount has to be applied in every operation of figures for determining a ship's position at sea before the calculation can be worked out. An objection has been raised to the proposition, to put back the astronomical to the civil day and issue the Nautical Almanac in mean civil time, on the ground that it would confuse the navigator and possibly lead to accidents of a serious nature. Can this be true? Is the intelligence of the shipmaster on such a low level that he cannot see the advantage of dispensing with an aggravating correction for time, the reason of which he is not conversant with, and the use of which he does not understand any more than that he must employ it or his calculations will not give the correct result? I, for one, do not believe it, and particularly so when the publication of the Nautical Almanac three years in advance gives him ample time and opportunity to make himself acquainted with the change. The astronomers, our own distinguished Astronomer Royal, Mr. W. H. M. Christie at their head, with that bonhomie which has always distinguished the followers of the starry science, have more than half removed our difficulty, for they have declared by a majority of 108 out 172—"It is desirable, all interests considered, that on and after the first day of January, 1901, the astronomical day should everywhere begin at mean midnight." This is the reply of astronomers of all nations to the circular letter of the Canadian Institute and Astronomical and Physical Society of Toronto Joint Committee. As to the difficulty of the twenty-four hours system and its relation to navigation, it is not worthy a moment's consideration, for has not the navigator to use the Nautical Almanac, a work compiled and calculated entirely on that system, and use it also under the worst of circumstances, with a constantly recurring correction of twelve hours and all the worry and strain of mind and body that constantly beset a seaman's calling. If we consider the subject, therefore, simply on the ground of the Nautical Almanac alone, as it relates to navigation, I think we are within our rights in saying that the change would greatly facilitate the working out of the various problems in use in that science, to say nothing of reducing the chances of error by one important factor, which has always to be considered, more or less, in calculations used for the purposes of navigation. If we critically examine the list of astronomers of the eighteen countries who have signified their willingness to adopt the civil for the present astronomical day we shall find that they represent 85 per cent of the tonnage of the world's marine, and if we take as evidence the replies given by the British and foreign shipmasters to the four questions, as stated in the earlier portion of this paper, we find the reply in the affirmative almost unanimous. Out of 200 replies received the answer is Yes to question 1 in 194 cases, or 97 per cent; to questions 2 and 3, 96 per cent; and to question 4, 92 per cent. Eighteen per cent of the replies received were from foreign shipmasters, who unanimously said Yes to all four questions. It may be interesting to state that the replies received from the British shipmasters, principally steamship captains, represent considerably over 200,000 tons of British shipping, whilst that of the foreign masters equals about 17,000 tons. Time has not permitted of a very extensive inquiry being made as to the opinion of the master mariners on the question at issue, but the replies received to the queries asked, over and above the 200 specified, average the same proportions. The inquiry is still going on and will be persisted in until the close of 1896, and the result will no doubt be a decidedly favourable expression of opinion for the adoption of unification of time, in its broadest sense, by the mercantile marine.

As to the greater benefits that will accrue to the public at large by the adoption of one universal time, and the twenty-four hour system of recording it, in our public intercourse, our national and international postal and telegraph services, and our home and foreign railway and steamboat communications I will not enter. Probably, when the telegraphic circuit is completed and it is possible to send a message to the Antipodes by the west, receiving a reply in the course of an hour round by the east, the incongruity of having two dates to a message and reply, and differing by a whole twelve hours in local time expressed may be forced upon us, and we may see the necessity for an immediate change. Leaving out of account the annoyance that will be experienced when long distance telephonic communication becomes a reality, long distance train services in Europe and America have already shown the necessity of adopting some regular method of time keeping; hence we have the adoption of standard time on both continents. This, certainly, along with the mean Greenwich time kept all over our island, is one link in the chain, but is still very far from the unification of time proposed. As to one prime meridian and the public advantages to be derived from it, I must leave it to geographers and teachers of geography to say, but coupled with one natural scale for all maps, I am forced to the conclusion that as aids to elementary instruction their adoption would be a vast improvement. Lastly as to the twenty-four hours time, we should soon learn to say "Meet me on 'Change at 15-30," or "I leave by the 19-15 express," in place of half-past three o'clock or quarter-past seven o'clock, for the latter mode of expression, after all, is wrong, if things progressive should be treated in a progressive way, and 19-15, which no one can mistake, requires less writing and distinguishing than quarter-past seven, for it wants p.m. before its full significance is, or can be, understood. They are considerations, however, which I will leave to thinking men and women. They will, I am sure, give them the attention they deserve, and in due time solve the problem of unification of time and public convenience.

These few remarks are, I am sorry to say, a digression and foreign to the idea with which I started this paper, namely, "Unification of Time and its Effects on the Practice of the Science of Navigation," but, as they are in some measure kindred subjects, I trust I may be pardoned for introducing them here. If I have not advocated the interests of the navigator in the changes contemplated to the extent that I might have done, and shown clearly all the many benefits his science would receive by their adoption, I hope I have said sufficient to awaken your interest and your sympathy as geographers in him, and in the question as it affects him and yourselves also. Without that awakened interest and sympathy all my efforts, however well or ill expressed, will avail not one jot towards achieving that end which I have had much at heart and constantly in view for many years, namely, one prime meridian; one universal time and method of reckoning it; and one natural scale for all commercial nations.

Deep Sea Sounding.—During a recent surveying cruise of the "Penguin" an attempt was made to obtain the depth of water within a small area south of the Friendly Isles, in the South Pacific, which previous soundings had shown to be unusually deep. The wire proved to be imperfect and snapped, but the depth obtained was 29,400ft., the bed of the ocean not being reached. This is the deepest known water in the world. It is nearly 1,500ft. deeper than the greatest depth in the North Pacific, and about 2,000ft. deeper than the deepest spot in the North Atlantic, —*Colliery Guardian*, Nov. 15, 1895.

THE POSITION OF GEOGRAPHY AS A SCHOOL SUBJECT.

By MR. E. G. W. HEWLETT, M.A., of Hulme Grammar School.

[Addressed to the Society, Wednesday, May 15th, 1895]

GEOGRAPHY, as a branch of knowledge, deals with the local environment of man, and with man himself so far as he is concerned with his local environment. On one side it regards physical nature, on the other it has a human aspect, and the study is thus twofold in character. The geographer's task is to collect and put in order the facts which bear upon the two sides of his subject, and it is evident that he will require as material the results of many sciences, and will be dependent on the labours of men working in various fields of knowledge. Adopting what scientists, explorers, and historians have established, the geographer rearranges this material from the point of view of locality, to use that term in the most elastic sense. The name of *Science* cannot be refused to Geography so far as it employs the method of induction and framing of general laws. It has been correctly described as a science, though one of imperfect *data*.^{*} Yet the main task of Geography is not to frame general laws, but rather to offer intelligent explanation and clear description of the facts of locality. Its characteristic method is, therefore, not the scientific but the philosophical. It is largely concerned with chains of cause and effect relationships, which occur fragmentarily in other sciences, but which Geography alone embraces in their entirety. Examples of this will occur to everyone. A striking instance is the case of the physical causes and wide-reaching effects of the monsoons of the Indian Ocean. On the one hand the physicist treats of the dependence of winds upon regions of high and low pressure, and of the connection of winds with rainfall, whilst the botanist examines the relations between rainfall and vegetation. On the other hand the traveller and the statistician supply information about the way of life, the industries and the distribution of population in the great northern plain of India. But the causal relation which subsists between the physical and the social circumstances of that region, it is for the geographer to point out, and upon it he will base his account of the significance of Calcutta and Kurrachee.

In the presentation of its systematised knowledge Geography uses in the map an instrument of its own. This is a contrivance which has been described as "condensing within the reach of visual perception space relations too wide to be embraced by the eye."† To represent on a flat surface the position of localities upon the spherical surface of the Earth in regard to the three dimensions is a very difficult art, and one of the tasks of Geography is to aim constantly at its perfection.

As a branch of knowledge, then, Geography has a wide scope, a characteristic method, and an instrument of its own. On what grounds is this subject included in education?

Whatever differences there may be as to the purpose of education generally, most people will be ready to admit that a school subject must have a moral value, or a value as a mental discipline, or a value as giving useful knowledge. Neither, I think,

^{*} See Oehlmann in "Fleckeisen's Jahrbuch," 1881, p. 273 ff.

† Lloyd Morgan, "Psychology for Teachers," p. 195.

will it be denied that it is mainly on the last ground, that Geography is recognised as a school subject. Its value as a mental discipline has been much underrated, as I shall endeavour to point out. But its chief title of honour is its utility. Every civilised man must know something of the earth beyond his own immediate experience. To the officer, the man of business, the journalist, the politician, the statesman, and the scientist, a knowledge of Geography is a necessary part of his professional outfit. In the range of school studies Geography, by its dual character, has a further value as connecting the scientific with the humanistic subjects, and thus completing the unity of a general education. Herbart said of it: "In the midst of other studies upon which more weight is laid, Geography is regularly neglected by the scholars, and often by the teachers themselves. This is very much to be blamed. Geographical instruction may be limited, but it should not be despised. . . . It connects the other studies and keeps them in touch with each other. Without it everything is uncertain. Historical events lack locality and distance; natural productions their place of origin. . . . If the component parts of knowledge are allowed thus to fall asunder, the whole effect of education is endangered."*

If Geography has a wide scope as a branch of knowledge, it must, like any other subject, submit to definite limitations in passing from the hands of the professional student into those of the educator of youth. These limitations are rendered necessary by the shortness of the time available for one subject out of many having concurrent claims on the pupil's attention, and by the imperfect capacity of the pupil himself. The teacher will have to make a selection of the subject matter, having regard both to the pupil's unformed but developing powers, and to the aim of geographical instruction; which, in accordance with what has been said, will be mainly to provide valuable knowledge. To secure this end it is not necessary, even were it practicable, for a boy to learn at school all the facts which may some day prove valuable to him in after life. But it is essential that he should be taught the main facts on an intelligent method, and acquire familiarity with the instruments Geography employs, especially the map. The three leading features of geographical teaching will therefore be—

1. Development of the pupil's powers in reference to the objects aimed at;
2. Training in the philosophic method of Geography; and
3. Training in the use of the map.

Each of them will require a few words of elucidation.

I. *Development of the pupil's powers.*—Geography is a study of things and not of names or words. It thus stands on a line with natural science, and in contrast to language studies. But while the object of study in the case of science can usually be presented to the pupil's observation, in Geography only a very small proportion of the concrete objects of study can in the nature of things come directly before the pupil. For the most part the object is a distant one, and though the older person forms ideas of such objects by analogy with those which have actually come within his own experience, this is more than can be expected of the very young. They are still concerned only with what comes before their senses at the moment. Rousseau pointed this out clearly. "The child reading is not thinking, he is only reading; he is not being taught, he is learning words only. . . . The sign absorbs the child's attention, and makes him forget the thing represented."† But if children have not yet the power to imagine or be interested in objects of which they have not direct

* Quoted in "Matzat, Methodik des geographischen Unterrichts," p. 81, a work which treats the subject thoroughly, and from which I have learnt much.

† "Emile," book III.

sense experience it is the business of the teacher to call it forth and develope it. Pestalozzi laid it down that since the source of all our knowledge is observation, leading to intuitive ideas, the educator should begin instruction by intuitive methods, and continue these until the intelligence is strong enough to rise without effort to the abstract ideas which result from the knowledge acquired by intuition. For this reason sound scientific teaching is based on experiment, *i.e.*, experience, and in Geography the start must be made from the immediate physical surroundings of the child. The practical issue of this for the teacher was admirably formulated twenty years ago at the Paris International Congress, where it was resolved that "the primary teaching of Geography should above all things be intuitive, should proceed from the known to the unknown, should introduce from the first the topographical element, beginning by representing in plan, and as far as possible in relief, the school ground, the parish, the district, the environs, and passing from the topographical map of the region known to the children to the geographical maps of the countries unknown to them." The task of the teacher in the primary stage is thus to lead the pupil to form ideas of geographical facts and establish the connection between them and their symbols whether in books or maps. In Germany this stage is called *Heimatskunde*, and is a regular feature in primary and preparatory schools.* At every later stage also the connection must be maintained in the pupil's mind between reality and symbol, by the employment of all the resources open to the teacher, such as photographs, lantern shows, and by the encouragement of observation in walks and travel.

II. *Training in the philosophical method.*—All facts which admit of it should be presented to the pupil in relation to their causes and their effects. In the study of any country prominence will have to be given to the climate, as depending upon the geographical position and the configuration, and itself conditioning the forms of life and human activity.† The systematic application of this principle in teaching calls in the intelligence as an aid to the memory, and thus raises Geography to a higher level in the scale of school studies. There are two important practical results from it:—

1. There must be no division of the subject into political or commercial Geography as separate from physical Geography. The facts of the two former cannot be taught apart from their causes without violating the principle just set forth. Mr. Keltie is emphatic on this point,‡ and both he and Mr. Mackinder, of Oxford,§ have insisted on the necessity of basing commercial Geography upon a thorough grounding in physical and political Geography.
2. As the ultimate causes of all geographical phenomena are physical, geographical teaching must be frankly based upon science. Not only must the teacher be able to deal adequately with the subject in this respect, but training in science should simultaneously form a part of the pupil's work also.

III. *Training in the use of the map.*—To establish in the child's mind the connection of the map with the object it represents is, as we have seen, one aim of the teacher in the primary stage—*Heimatskunde*—in which the plan of the schoolroom is the first form of map shown. As soon as this connection is fixed in the mind, the pupil can begin to make use of the stores of geographical knowledge contained in

* And in some of our primary schools also. See Mr. Keltie's Report, p. 451.

† See Education Report of this Society, p. 28 (Reply of Messrs. Macmillan).

‡ Report, p. 457.

§ See Journal of this Society, vol. VI., p. 1.

maps, and conversely to express simple geographical facts by drawing maps himself. The map must take an important place in geographical teaching, because it is an instrument peculiar to Geography, and is the only medium for expressing those physical facts for which language is but an imperfect vehicle, such as the course of a river or the shape of a continent. Facts such as these must be taught and learnt from the map and not from the text-book, and are best fixed in the pupil's mind by map drawing. To the neglect of these three principles are due many faults which have been and still are rife in the teaching of Geography. Neglect of the first leads to the substitution of words for realities, to the child's learning by heart names which have no bearing on anything within his experience, and are to him meaningless sounds and signs. A violation of the second principle transforms Geography into a mere collection of isolated facts, which may be forced by cramming upon the memory, but cannot be assimilated by the intelligence. To a neglect of proper training in the use of maps may be ascribed the provision for the public of birds'-eye maps, in which the attempt is made to combine a map and a picture* for the benefit of people who are unable to understand a scientifically drawn map.

If Geography has had a bad name amongst schoolmasters as a subject of no educational value,† the reason is that it has been judged by the bad methods followed, and in ignorance of the capabilities of the study when right methods are adopted. Taught properly the subject has a value of its own as a training for the mind, apart from the worth of the information it gives. The systematic study of cause and effect fosters enquiry and exercises the reason, while the observation is sharpened and strengthened by the use of maps.

Having thus examined the *raison d'être*, aim, and characteristics of Geography as a school subject, we pass to the consideration of its actual position in our schools.

II.

Ten years ago the Royal Geographical Society appointed Mr. J. Scott Keltie to conduct an enquiry into the state of Geographical education. His report contains the results of his examination in English and Foreign Schools, and forms a very valuable document.‡ The Manchester Geographical Society followed up Mr. Keltie's work by an enquiry into the state of the subject in the various institutions in and about this City, which furnishes some important additional material.§ These two reports will give some ground to go upon in considering the present position of Geography in schools, a task which without their help I should not have attempted.

I. The elementary or primary schools were the only ones where Mr. Keltie in 1885 found Geography established upon a systematic basis in this country, and for this reason he did not enter into any detailed report on the state of the instruction there.|| They are of course under the control of the State, which requires a definite curriculum to be gone through, and all teachers to satisfy certain conditions. The training of the teachers is also under State control, the Education Department prescribing the course of instruction in training colleges, and the requirements for the qualifying examinations.

The present regulations for the subject in elementary school programmes are as follows: Geography is placed among what are called class subjects, one of which must

* The same mistaken attempt is made even in some school maps.

† See Mr. Keltie's Report, pp. 528-9.

‡ Royal Geographical Society, Supplementary Papers, Vol. I., Part 4.

§ Report of the Education Committee to the Council on the subject of Geographical Education, 1886.

|| Mr. Keltie's Report, p. 451.

be taken. It is not compulsory,* but an annual grant is obtainable for a class subject upon the Inspector's recommendation. Before 1890, English (including Grammar) was obligatory as a class subject, and since schools in poor districts are sometimes unable to take more than one class subject, Geography was not taught at all in such schools. Since 1890, however, English has lost its privileged position amongst the class subjects, and in schools where only one class subject is offered Geography has largely taken its place. In proof of this I will cite some figures from a report made to the British Association in 1894, on the condition of science teaching in elementary schools. In 1889, the year before the change, English was offered as a class subject by 20,300 departments, Geography by 12,300. In the next three years the numbers were—

| | | |
|----------|----------------------|------------------|
| 1890 ... | English 19,800 | Geography 12,800 |
| 1891 ... | „ 18,100 | „ 13,400 |
| 1892 ... | „ 17,300 | „ 14,200 |

Thus in the four years 1889-1892 the number of departments taking English decreased 3,000, while those taking Geography increased nearly 2,000. Geography then is becoming more general in elementary schools, but there are still many departments where it is not taught at all.

The course prescribed is well planned, enabling the capable teacher to have full regard for the development of the child's capacity. Alternative courses are allowed, but they agree in commencing with the school locality and the meaning and use of a map. Mr. Keltie speaks very favourably of much that he saw in the schools visited by him, where he found teachers taking a real and intelligent interest in the subject. The necessity of earning a grant on the inspector's report,† must, however, be hampering to sound teaching in the case of Geography, and upon this point elementary teachers would no doubt have a good deal to say. Much of course depends upon the Inspector's conception of Geography, and in this regard I think the instructions to Inspectors in the case of Geography, which have remained in force for some years, and are excellent so far as they go, should be made to include an explicit reference to the *causes* of geographical phenomena. But what is also wanted is the abolition of this system of payment.

On the study of Geography in the Training Colleges for Elementary Teachers, Mr. Keltie made a very appreciative report at the Bern Geographical Congress in 1891. Judging by the examination papers set, the standard was, he said, comparatively high; the students were expected to do more than learn a string of facts and draw pretty maps; they were incited to think and reason, and apply their facts to practical uses.

The Royal Geographical Society awards ten prizes annually on the results of the papers in Geography, and thus gives a valuable encouragement to the study of the subject in Training Colleges. Formerly all students took Geography in their first year at the College, but those who had passed in the subject at the end of their first year at the College were not obliged to take it in their second year. But by a change which came into force in 1891 a student passing with high distinction in Geography in the Queen's Scholarship Examination, which is taken before entrance into a Training College, is exempted from any further study of the subject at the College, the time which would otherwise have been devoted to Geography being given to a language or a science. The reason assigned for this permission is that an increasing

* Mr. Keltie, p. 451, reported in 1885, that Geography was compulsory. In this I think he was mistaken. At any rate it is not so now.

† The grant is 1s. or 2s., according to the report and recommendation of the Inspector.

number of pupil teachers, during their four years of apprenticeship, are now receiving systematic instruction under specially skilled teachers in the subject. But, without in any way questioning the value of such instruction, I do not believe that it can or ought to replace instruction under a competent geographical teacher in the Training College itself. If the teaching of Geography in elementary schools is to advance in efficiency, and not to remain stationary or recede, the schoolmaster must receive a more thorough training in the subject, its methods, and apparatus than he is likely to receive as a pupil teacher. The result on the Geography classes in Training Colleges is that they lose in importance and value by the abstention of the best students, while the subjects which are thus preferred to Geography are subjects of little real importance in elementary education. Geography, if not universal, is taken in the great majority of schools and is increasing in popularity, while Latin or French or Science are taken only by a small minority. One would have imagined the soundest course would be to ensure a thorough preparation of the teacher in main and essential subjects, and not to neglect them for the sake of others of less importance. In Germany, where Geography is in the hands of thoroughly trained teachers, not only is it required in the entrance examination to the Training Colleges for primary school teachers, but there is a three years' course of Geography in the College, which includes introduction to the method, and instruction in the use of atlases, wall maps, globes, etc., and it is an important subject in the final qualifying examination.

A retrograde move such as this is very discouraging to those who have generously assisted in the establishment of a lectureship in Geography at Owens College for the special benefit of the Day Training College.

To resume this account of primary school teaching of Geography—

1. The State secures definite curriculum and controls training of teachers.
2. Geography is not compulsory, and is not taught at all in some schools.
3. Geography is becoming more popular as a "class subject."
4. A retrogressive step has been taken by the Department discouraging the study of Geography in Training Colleges.

II. In passing to the condition of Geography in secondary schools, we come to a difficult part of our subject. The term may be taken to include all schools not under the control of the Education Department, and it is very hard to speak in general terms of the heterogeneous assortment of institutions which comes under this title. Perhaps the simplest way of presenting the question will be to take for comparison the example of a country in which secondary education is taken in hand by the State, and where it consequently assumes a more uniform character. Let us see how such conditions operate upon the *status* of Geography.

In Prussian secondary schools we find that—

1. Geography has a recognised and compulsory place in the time table. Two hours a week in all forms but the highest are allotted to it.
2. Its field is prescribed and arranged so as to secure a boy's going through a complete course.
3. Teachers must have received a training in the subject.

Of these the first two are important provisions, but most important of all is the last, and it will be well to enquire a little further into the preparation of Prussian secondary teachers for their work. Before a man can take a post in a secondary school he must possess the *facultas docendi* or diploma of competency to teach. To obtain this an examination must be passed in one of four groups of subjects, in two of which groups Geography is obligatory. For the qualification to teach Geography

in the higher forms the candidate has to show "that he has pursued systematic studies in all parts of geographical learning, and has acquired such a detailed knowledge as to be acquainted with the countries of the world, as regards their physical conditions, the influence of the physical conditions upon the character and development of the nations, and their political conditions, so that he shall be able to connect the historical and geographical teaching in the most fruitful manner." Mr. Keltie says that the chief work of the professors of Geography in German Universities is to prepare candidates for the *facultus docendi*, and as they are experts of the highest distinction there can be no question of the soundness of the provision made for training of teachers of Geography in German schools.

Mr. Keltie says he found masters well trained in the subject and its pedagogics, good materials, text books, and maps in use, and considers that boys would leave school with their memories stored with living images and solid information, instead of strings of lifeless words and figures. I have myself had the advantage of being present at a geographical hour in the Realgymnasium, at Weimar, and I was much struck with the activity in the work shown by the boys themselves; they did not require constant questioning; a word from the master was enough to elicit a continuous and well-ordered account of geographical features. It was clear to me that they were drawing not from memory only, but from knowledge.

Let us now compare with this state of things the condition of Geography in English secondary schools, over which there is no Governmental control. In doing so I shall follow Mr. Keltie's report except so far as there is reason to believe that changes have taken place during the ten years which have elapsed since it was presented.

1. The subject has, it is true, a place in nearly all curriculums, but for the most part it is taught only to the lower half of the school.*
2. There is frequently an absence of definite plan, of any succession of study in geography, so that there is no guarantee that a boy shall pass through a course complete from any point of view.
3. No previous training is required of a secondary schoolmaster, neither is any provision whatever made for it. The effect of this lack is less injurious to traditional subjects, such as the classics, than to Geography, and all subjects in which traditional methods either do not exist or are radically wrong.
4. The usual requirement for a secondary teacher is the possession of a University degree, and until quite recently there has been no provision for the teaching of Geography in the Universities. It is as yet too soon to look for any results of the establishment of such provision upon the qualifications of assistant masters. Any preparation in Geography on the part of a University man intending to become a schoolmaster would be purely voluntary, as it is not a requirement in any of the degree examinations.

The means, therefore, which we have seen to be so effectual in securing efficiency in Germany, namely, State control and organisation, is wholly inoperative in this country, while the Universities, whose influence is so powerful over our secondary education, have until quite recently done nothing for Geography.

Are there any other agencies which in a less systematic manner may be found to be working favourably for or encouraging the teaching of Geography in our grammar

* When M. Leclerc remarked on the small amount of geography at Dulwich, Dr. Gilkes replied, "Ne craignez rien; ils l'apprendront en courant le monde."

schools? Among such we may consider the examination system, the provision of materials and books by educational publishers, and finally, individual effort on the part of teachers themselves.

The influence of public examinations is on the whole injurious to the teaching of Geography, for it is not a "paying" subject, and as such is treated with the neglect which it deserves.* The requirements in Geography for the public services are very elementary and compare poorly with those which aspirants to the French or German army and navy have to satisfy. Meagre as they are, they are too much, according to Mr. Keltie,† for any but the army classes in our public schools, and are left to the crammers.

To the University Local Examinations we must give credit for having kept Geography in a position of some importance in the work of schools which prepare for them. Until recently the Geography paper has been of the traditional order, affording merely a test of the possession of a certain multifarious information. But the presence of trained geographers in the Universities is already making itself felt in the papers and requirements of the Local Examinations.

Commercial Geography is in some cases a subject for the scholarship and exhibition examinations held by County Councils under the Technical Instruction Act. It is required for example by the Lancashire County Council for commercial scholarships and exhibitions. There can be no doubt that this will act favourably upon the position of Geography in Lancashire schools, and it is to be regretted that the Manchester Corporation Technical Instruction Committee have not seen fit to make a similar provision. But since children up to the age of say fifteen ought still to be mainly occupied with the fundamental facts of Geography, it would in their case be better to substitute a paper on general Geography.‡

There has been a general improvement in text books, atlases, and wall maps of late years, which has undoubtedly had an excellent effect upon the teaching of the subject in many secondary schools, and is largely due to the action of the Royal Geographical Society and the interest stirred up by Mr. Keltie's report. Some years ago one would have sought in vain for any school atlases even approaching the excellence of Macmillan's School Atlas, Longman's New Atlas, Longman's Five-shilling Atlas, Philip's Systematic Atlas (or Mill's Atlas of Commercial Geography). In text books there was a void before the appearance of Chisholm's School Geography, and Junior School Geography (Longman's), of Mill's General Geography, and Mill's Elementary Commercial Geography. Many of the new materials and books have derived their best features from German models.

In the absence of any preparatory training of teachers in Geography, the quality of the text books, atlases, and handbooks for teachers is of all the greater importance.

For the main agency we find working for the good of Geography in the schools under consideration is the individual interest and exertion on the part of the school-master himself. Mr. Keltie found this to be the case in 1885, and that where the master had a particular liking for the subject, and had taken some pains to master it, it assumed some importance under his hands. But even then teachers were often groping in the dark; they had seldom had any training in the best methods of teaching it, and complained of the lack of satisfactory text books, maps, and other apparatus.§ There

* Mr. Keltie's Report, p. 454.

† *Ibid.* p. 472.

‡ This has in effect been done, in 1896, in the Lancashire County Council's examination for junior commercial exhibitions.

§ One of the most powerful influences in this district was the very costly exhibition of maps and geographical appliances held in the City Art Gallery in 1885, when for several weeks lectures were given by geographical experts. (See report in "*The Journal of the Manchester Geographical Society*," Vol. II.—EDITOR.)

are no doubt still too many schools where the subject, if taught at all, is taught in a perfunctory manner. But things are better than they were, for the vast improvement in text books and atlases which we have noticed has made it less difficult for a master with an interest in his work to get a grasp of the subject and become an efficient geographical teacher. Many wants have yet to be supplied before our provision of materials can be called satisfactory. Our atlases are very good, but too dear for general use throughout a school. The maps in them should be sold singly, like the excellent maps in Wagner's *Methodischer School Atlas*. The maps in Wagner's *Atlas* also correspond with a series of wall maps of moderate price and excellent workmanship, and this correspondence is a feature helpful to the teacher, but unknown to the English publisher.

The friends of Geography make no presumptuous demands on behalf of their subject, but simply claim for it recognition, side by side with the other subjects of importance in secondary schools. If Geography had as good a place in our time tables as is accorded to it in Germany, we should be satisfied so far as length of hours went. But the change we most strive for is not extensive but intensive. The time already allotted to Geography we wish to see employed to better purpose in teaching, based on a sound knowledge and conducted on enlightened methods. That can only come about when secondary teachers are obliged to train themselves for their work before entering upon it. What we have most to hope from is that the State will make its influence felt in the organisation and working of secondary schools, and assume the responsibility for the efficiency of secondary schoolmasters. We have seen the results of such influence in Germany, and there are plenty of signs that it may be a reality with us in the near future. It is ten years since Mr. Keltie made his report, and we have seen much improvement since then. Perhaps in another ten years' time we may be able to look back upon the beginning of a new era in Geographical education.

The excellent text books of Dr. Yeats seem not to have come under the notice of Mr. Hewlett. They are simply invaluable books, and are the work of an expert in Geography, and of an experienced examiner.—EDITOR.

A Proposed Great Terrestrial Globe (Mr. T. Ruddiman Johnston's Patent).—If this design is completed in the way suggested by Mr. Johnston, the result will be a remarkable and interesting lesson (Globe) on Physical Geography. We give Mr. Johnston's proposal in his own words: "No one will deny that it is desirable that the British people should have a better knowledge of the surface of the earth than they at present possess. The action of the Government is cramped, commerce impeded, and emigration checked by the nation not fully recognising its responsibilities and opportunities. To a nation that has possessions in every quarter of the globe—possessions which cover about a fifth of the earth's surface; which imports a large portion of its food and raw material; which depends greatly on foreign markets for the disposal of its manufactures, and which owns over one-half of the world's shipping, a knowledge of geography is essential. When it is realised that the affairs of almost every foreign country are directly or indirectly of interest to us, that we have possessions conterminous with thirty or forty Foreign States, and practically with Russia and Persia, and with many Native States in Asia and Africa, that in India we control a population about eight times greater than that of the British Isles, and that communication with it must in no way even be threatened, some idea will be formed of the responsibility we carry, and the necessity of a strong navy and efficient army for our protection. It is proposed to erect, in London, a

Terrestrial Globe on the scale of 1/500,000 of nature, *i.e.*, a globe having a diameter of eighty-four feet, and showing the earth's surface on a scale of about eight miles to the inch. At Paris, in 1889, a globe was exhibited of one-half the diameter, and therefore one-fourth the surface area, of this proposed one, but as the geographical matter was treated very generally and without detail, a similar globe would probably not prove attractive in this country. On the proposed globe every geographical feature of importance will be shown and named, as will also be every city or town having 5,000 inhabitants, and a large selection of others with a smaller population. As all colours and of all strengths can be employed, great clearness can be obtained by showing rivers and lakes in blue, mountains in their natural colour, plains in green, deserts in yellow, roads in grey, and railways in red; and the names of these can each also have a distinctive colour. The colours again used on the physical features will be kept cold at the poles, and gradually warmer as the tropics are approached. The globe, unlike a map, does not distort, but will show all countries in their relative positions, and of their correct dimensions, and the land will be so tinted and the mountains shaded that a graphic representation of the earth's surface conditions will be given. On the globe, however, comparative areas will be clearly shown, and on a sufficient scale, for Great Britain will measure on it from north to south over six feet, India from east to west about twenty-three feet, and the United States from east to west about thirty feet. The extent to which physical geography will be indicated on the globe will be decided after those interested in this branch of science have expressed their views. On the oceans there is ample room to show currents, prevailing winds, temperatures, salinity of the sea, the depth and nature of ocean beds, pressure of the atmosphere and variation of the compass; but on the land, though the geographical distribution of plants and animals and even other matter may be indicated, it should not be lost sight of that the globe is not intended to supersede atlases and reference books, but to encourage their use, and that the general public will visit it more to see where they and others are, or to ascertain quickly from it some desired general information, than for scientific research. Anything that will excite the public interest in geographical matters should be inserted on the globe, but it should not be crowded, as so many atlases are, with information that can be better supplied in another form, as this is more likely to repel than attract those desirous of gaining information from it. The surface of the globe will contain 22,000 square feet, and would, if developed into a band one foot high, measure over four miles in length; but unless the globe can be made in a reasonable time it will be difficult to secure interest in it. By ordinary methods of map-making it would take a great number of years to construct the globe, if it could be constructed at all, for the parts first done would be out of date long before the final parts were commenced. I have, therefore, developed a process which, by fully utilising the skill we nationally possess in other directions, will permit of its construction in less than two years, and, afterwards, of its correction when desired. In the making of the globe I hope to have the views of all those having a special knowledge of any portion of the earth's surface, and shall confine my labours to systematising the information supplied, organising a staff, and guiding it towards the satisfactory completion of the globe. The globe will be examined from a spiral gallery running round and round it, to the upper end of which the spectator will be taken by an elevator, and, as the globe is slowly revolved, every portion of its surface will come into view. It is hoped that the globe will enable the public to quickly estimate the enormous territory we own beyond the seas, the latent wealth waiting development in it, and the means provided by our shipowners for easily reaching any part of it; and that when the community is fully interested in 'Greater Britain' our national prosperity will increase 'by leaps and bounds.'

NOTES OF ADDRESS ON "THE ORIGIN AND CHARACTERISTICS OF OUR BRITISH SCENERY."

By Mr. OSMUND W. JEFFS.

[Addressed to the Members of the Society, Wednesday, Nov. 4th, 1895, at 7-30 p.m.]

MR. JEFFS said that he ventured to regard the subject of his address as within the recognised region of discussion by a Geographical Society. The origin and characteristics of our scenery were matters which concerned all who desired to learn something of the growth and development of the landscape features around us. The relations between the Science of Geology and the infinitely larger Science of Geography were most intimate. In recent years, it was pointed out, there has been a remarkable enlightenment in the popular appreciation of the aims and scope of Geography, a result in which the labours and influence of the Manchester Geographical Society have played no small or unimportant part.

There were two methods of studying natural scenery—one was the æsthetic method, upon which little would be said that evening; the other being the scientific method, which was necessary in order to arrive at an answer to the question: Whence comes the wonderful variety in the landscape features of the earth ever before our vision? On examining the earth's surface closely, we perceive that the features which so much delight us are not permanent; on all sides we see evidences of change. Our shores are worn away by the resistless waves of the sea; the plains are strewn with *débris* by the streams; mountain torrents carry away the solid earth and transport the eroded material to the sea bottom. The lowlands are being gradually altered by the silent progress of ever-acting nature, and also in great measure by the operations of man himself. The mountains, too, which tower high above us, are slowly crumbling away: not a rainfall or storm blast but leaves its mark by loosening the rock masses, whilst each tiny streamlet rushing down the hill-sides carries with it a part of the solid substance of the mountain.

By the term "scenery" is meant the characteristic natural aspect of the landscape with all its varied undulations of hill and valley, mountain and moorland; the ever-changing coast-line, relieved here and there by the broad estuary of a river or by the narrow outlet of a winding stream; it includes, in fact, all the natural features which meet the eye when gazing upon an expanse of land or water. Our landscape scenery was shown to depend on two main causes: Firstly, upon geological structure; and, secondly, upon the amount and character of the denuding agents which aid in carving the landscape into its varied outline of hill and valley. The leading geological causes which operate upon our scenery may be thus summarised:—

1. *The Nature of the Rocks beneath our Feet.*—(a) Hardness; (b) chemical composition; (c) structure and stratification; (d) dip, angle of bedding, and relation to overlying and underlying rocks; (e) properties, such as cleavage and jointing and faulting.

2. *The Character of the Various Denuding Agents which have Acted upon the Rocks.*—(a) Atmospheric agents, rain, rivers, frost, water and ice action; (b) marine agents—the sea, force of marine breakers, battery of shingle and fragments of rock, wearing out of caverns and gullies and the erosion of sea-stacks; (c) effects of glaciation in the Great Ice Age.

3. *Oscillations, or Changes in Level of the Land*, bringing rocks of varying ages and structures within reach of disintegrating agents; the formation of raised beaches and shell-mounds; and the occurrence of submerged forests and peat beds.

4. *The Effects of Volcanic Forces*, acting at or near the surface; and of deeper-seated igneous forces, by which strata have been disrupted, contorted, and otherwise disturbed; mountain chains elevated and some plateau-areas formed.

This portion of the address was illustrated by sections of the crust of the earth, showing the strata, and by relief-maps, contrasting the hilly and lowland regions. Some views followed, showing the Leasowe shore and submerged forest beds, which indicated an alteration in the level of the land. By way of explaining the action of the sea in eating away the land, forming caves, arches, and outlying pillars of rock, a succession of photographic views of coast scenery was thrown upon the screen. The power of the waves has been estimated to be equal to a pressure of nearly three tons on the square foot, and so great are the destructive effects of the sea that whole villages have in many instances been forced to retreat inland owing to its encroachments. This abrasion of the coast-line depends upon the physical characters of the rocks presenting resistance to the sea. On the eastern side of the British Isles the waste is more rapid than on the western, not because the waves of the North Sea are more powerful than the breakers of the Atlantic (the reverse being the case), but on account of the rocks on the eastern coast being of softer texture and more easily worn away than those on the west. The action, however, of the atmosphere was found to be more destructive than that of the sea, as noted in the shape of the cliffs, well seen in a fine view shown of Bradda Head, off the Manx coast. Volcanic rocks gave a special character to the scenery, as observed in the familiar instances of the basaltic rocks of Staffa and the Giant's Causeway. Examples were next given of estuaries which were stated to be sunken valleys, and not simply arms of the sea. The history of streams and rivers was next traced from the simple rivulet to the foaming mountain torrent, and this part of the lecture served to introduce some striking views of valleys and river gorges. The beautiful scenery of Derbyshire was referred to, the dales being explained to be the result of the solvent action of the water upon limestone strata. Thus, rains and rivers were the unwearied destroyers of all lands; both by sea and stream our land was being degraded and levelled. Who should say what would be its future destiny?

The concluding part of the address dealt with the scenery of mountains and moorlands, the excavation of deep valleys and lakes by glacial action, and the formation of hills and mountains. It was often asked, Why was Cheshire a plain? The origin of the great plain of red sandstone, with its associated beds of rock salt, was briefly reviewed. An aspect of scenery not usually noticed was indicated, namely, the relation between the scenic structure of a region and its inhabitants. The reality of this relation was apparent in the contrast between the dwellers in the plains and in the Highlands.

The above-named geological causes have not only affected the landscape scenery, they have exerted a most important and guiding influence upon the distribution of centres of population, upon the habits and industries of the people, and even upon their health and welfare, so far as these are dependent on their daily avocations. The sites of our leading towns and manufacturing centres have been established in regard to the proximity to coal deposits and stores of iron and other valuable minerals in the earth's crust; while, in the same manner, the favourable occurrence of natural harbours, convenient estuaries, and inlets of the sea, has been the original cause of the growth of so many of our seaports from which, throughout historical times, our foreign commerce has been largely directed.

In conclusion, it was pointed out that scenery has also had no small influence on the building-up of national character and sentiment, which characteristics are again reflected in the art, poetry, and literature of our country. No hard and fast line could be drawn between art and science; to the artist the diversified features of hill and valley are full of beauty, but it is to the scientific observer that the history of their origin and development becomes fully apparent.

PROCEEDINGS OF THE SOCIETY.

JULY 1ST TO SEPTEMBER 30TH, 1895.

The 349th Meeting of the Society was held at the Japanese Museum of Mr. Consul Bowes, Princes Road, Liverpool, on Saturday, July 6th, 1895, at 3 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The following communications were read to the members:—

From Lieut.-Col. Sir A. J. Bigge, K.C.B., R.A., Private Secretary
to Her Majesty the Queen.

Windsor Castle,

June 25, 1895.

Dear Sir,—The Queen will have much pleasure in accepting the two volumes of your Society's Journal you mention.

Will you kindly have them sent, addressed to me, at Buckingham Palace.

Yours very faithfully,

(Signed) ARTHUR BIGGE.

From Major-General Francis W. de Winton, G.C.M.G., C.B., R.A.,
Comptroller and Treasurer of Household of their Royal
Highnesses the Duke and Duchess of York.

York House,

St. James' Palace,

June 23, 1895.

Dear Sir,—I am desired by H.R.H. the Duke of York to convey to the Manchester Geographical Society his thanks for the nicely bound copies of the Society's Journal which you have so kindly sent him.

Yours faithfully,

(Signed) F. DE WINTON,

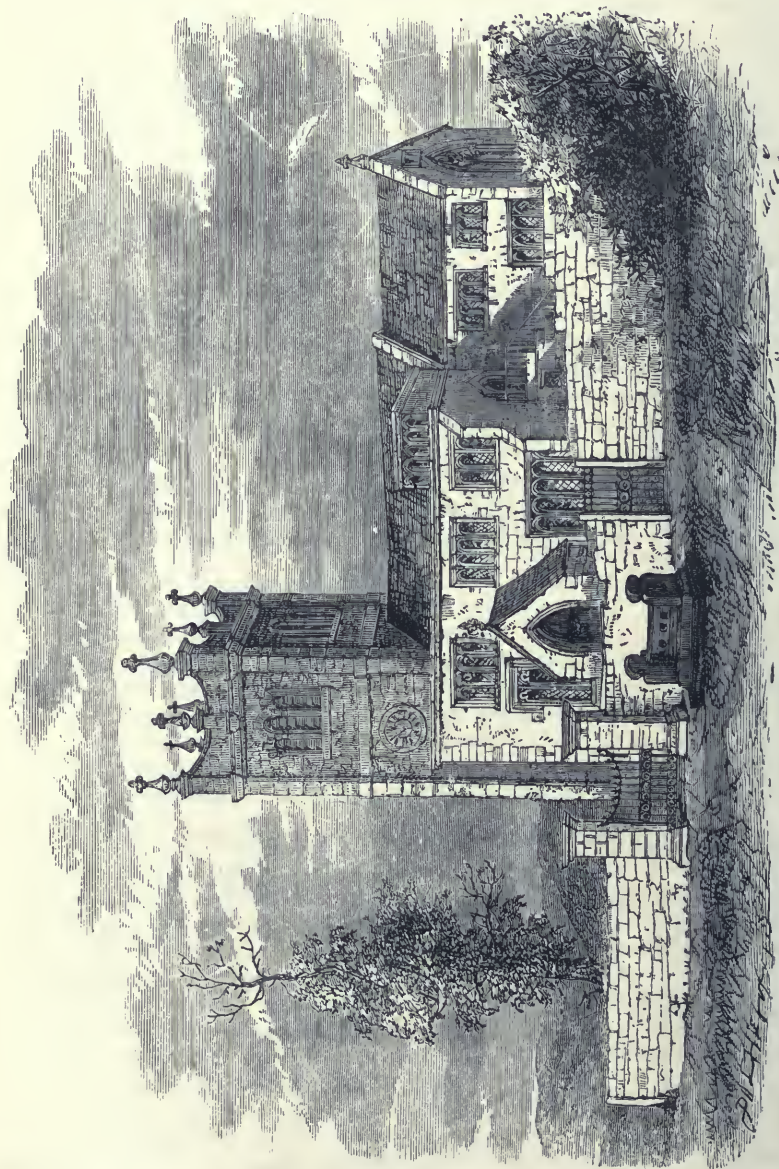
Major-General.

From the Right Honourable W. E. Gladstone.

*Dear Sir Allow me to offer my very
sincere thanks for the beautiful gift
which the Society has been so good as
to present to me. I remain
Yours very faithfully*

W. E. Gladstone

Jul 3. 95



OLD CHAPEL OF ST. CHAD, SADDLEWORTH.

From Mrs. M. E. J. Makinson, and from Mrs. Clemson and family, expressing sincere thanks for kind sympathy.

From Mrs. U. M. Bright, Mr. J. S. Keltie, Commander Phillips, Bonalya Bey, and Mr. D. Meldrum.

Mr. Consul Bowes and Mrs. Bowes received the Chairman of the Council and the members. Mr. Bowes, in his own delightful way, spent some hours in exhibiting and explaining the fine collection of Japanese artistic treasures in his unique and beautiful museum.

At the conclusion of the description, the CHAIRMAN presented to Mr. and Mrs. Bowes, on behalf of the Society, the last four volumes of the Journal of the Society, and expressed the delight he had experienced on the occasion.

The Chevalier FROEHLICH moved a hearty vote of thanks to Consul and Mrs. Bowes for their kind reception of the Society once more.

The vote was seconded by Mr. BELISHA, and was supported by Mr. Alderman Bowes, Mr. J. EDMONDSON, and others.

Mr. Consul BOWES responded, and this most instructive and interesting visit closed.

The arrangements for the party by the Midland Railway Company made the journey out and home a very pleasant one.

The 350th Meeting of the Society was held at Messrs. Brocklehurst's Silk Mill, Macclesfield, Wednesday, July 17th, 1895, at 3 o'clock p.m.

A large company of members availed themselves of the opportunity to visit these celebrated silk works, and, under the guidance of Mr. Snow, had the pleasure of his lucid explanation on this visit.

The various kinds of silk were shown in the raw state, and the origin of the cocoons pointed out with an instructive account of the special qualities of the raw silk in cocoon and hank as brought from the various silk-producing countries. From the raw silk room Mr. Snow took the party through the extensive works and exhibited the process of manufacture from the raw filament to the most beautiful finished product. The visit extended over a considerable time, and was one giving great instruction and enjoyment to the members.

The wonderful machinery required to produce the finished articles, the quiet of the rooms (very striking to those who are accustomed to the clatter of woollen and cotton machinery), and the cleanliness of the workpeople, most of whom were females, were most striking.

The members were very glad to hear that the silk trade is a little better than for some time it has been.

The visit was one of great interest, and very hearty thanks were given to Messrs. Brocklehurst for permission to visit their acres of works and for Mr. Snow's patient and courteous guidance.

After tea, visits were made to the fine park of Macclesfield, to the Town Hall, and to the Church. Some time was expended on the Church, which was found full of interest.

Thanks to the conductor of the party were given.

The 351st Meeting of the Society was held at Hopwood Hall, Heywood, Saturday, July 20th, 1895, at 5-30 p.m.

Alderman HEALEY, of Heywood, met the members at the Heywood station, and conducted the party to the new Technical School.

A thorough examination of this beautiful building and its contents was made, and the Kay Library was also examined.

The inspection of the building and the explanations of the secretary and of Alderman Healey took up a considerable amount of time.

Carriages were then taken to Hopwood Hall (permission from the owner having been obtained through the kind intervention of Mrs. Hopwood), one of the least known of Lancashire historic halls.

The Hall is situate in and almost hidden by the beautiful woods surrounding it. It does not look a very ancient building outside, but is evidently older than it looks when access to the interior has been gained.

Amongst other things Lord Byron's bed is shown, and he is said to have occupied the room and bed as they now are. Armour, paintings old and new, and tapestry are exhibited; but the collection of old furniture, carved in the most beautiful and fantastic way, and the splendid collection of birds and animals, are perhaps the two things amongst this wonderful collection which will remain as a permanent recollection of those who had the good fortune to be present.

Middleton Church was intended to be visited, but this had to be deferred owing to the visit of a fine thunderstorm with heavy rain.

Most hearty thanks were given to Mr. Hopwood and the housekeeper for their kindness, and to Alderman Healey for his admirable guidance, and the party then returned home.

The 352nd Meeting of the Society was held at Mr. Dentith's House, Dobcross, Saturday, August 10th, 1895, at 6 p.m.

A large party of members assembled at the Oldham station, where carriages were taken, and the lateral valleys were travelled through.

At the Junction Hotel, Denshaw, Mr. Morgan Brierley received the members along with another party of members already present.

The walls of the large room of the hotel had been covered with geological maps of the district, diagrams and sketches; and Mr. Brierley addressed the Society in a lucid and pleasant way on the geology of the district, on the place names, the manners and customs of this backwood part of Yorkshire, on the peculiar ecclesiastical history of this part of the Diocese of Manchester, on the complete changes brought about by the introduction of the factory system into these valleys. The decay of a number of small hand-loom weaving hamlets having on the journey been much commented upon was thus explained. Mr. Brierley then described the effect of the making of roads, the canal, and railway through the district.

Very hearty thanks were tendered to Mr. Brierley for his interesting and instructive description of the district.

The members were then driven by Friar Mere, through the Delph Valley to Dobcross, where the members were entertained by Mr. and Mrs. Dentith.

The thanks of the members were heartily given to Mr. and Mrs. Dentith.

Mr. DENTITH responded, and said it would give him and Mrs. Dentith very great pleasure to receive the members at any time.

The 353rd Meeting of the Society was held in the garden of the Venerable Archdeacon Anson, at Birch, on Thursday, Aug. 15th, 1895, at 7 p.m.

The Venerable Archdeacon received the members at Birch Church, and proceeded to give a short account of this old and interesting Manchester district.

The Archdeacon explained the beautiful windows of the church, and gave some account of the donors; he then drew attention to a fine piece of mosaic work erected to the memory of a parishioner. The subject is the Annunciation, and is a charming piece of work.

The party then proceeded to the rectory garden, the Archdeacon giving an account of the Nico Ditch, tracing it from Reddish on to its outlet at the side of his garden into the Black Brook.

The remarks on the Danish and Saxon remains in the district were most interesting, and the visit was brought to a close after an examination of the ferns, azaleas, rhododendrons and other flowering trees.

The garden is entirely the work of the Archdeacon, who is proud of it and always glad to exhibit its beauties.

Very hearty thanks were given to the Archdeacon for his kind reception of the members.

The 354th Meeting of the Society was held in the Society's House, Monday, October 7th, 1895.

The Chairman of the Council, with several members of the Council, received the members at 5-30 p.m.

A large collection of new maps, photographs, and a fine set of Japanese war sketches (coloured by hand), with some black and white sketches, were exhibited.

A most interesting account of the battles near Moukden fought by the Japanese and Chinese, with sketch maps drawn on the field by himself, was read from our member at Newchang, Mr. Segitzvary.

The Chairman of the Council (the Rev. S. A. STEINTHAL) presided at the meeting, and congratulated the members on the beginning of a new session, and welcomed them to the opening meeting. He referred to some very serious losses which the Society had sustained during the last few months. They had welcomed in past years Mr. J. Thomson, who had travelled much in Africa, and who had the remarkable distinction among African travellers of never having caused the death of one of the natives among whom he had travelled. They had recently received an announcement of the death of Bishop Maples, of Nyassaland, who was with the Society a few months ago, when they were able to wish him God-speed in his journey. He had unfortunately been drowned. They had not yet received particulars of his death, but it was within their knowledge what good work he had done within his sphere. He had also to speak of Mr. O'Connor, whose presence they would greatly miss at their meetings. They trusted that the members of the Society would do their best to fill these vacant places, so that, though individuals might pass away, the Society would not want for members to carry on with vigour the work to which it had so long and so usefully been devoted. The Chairman subsequently announced that on the 21st of that month King Khama would be in Manchester, and he hoped that during the day the Society would have the honour of welcoming him.

The minutes of the meetings of the Society from March 13th to August 15th (331 to 353) having been read, were approved.

Letters and communications were read from Mr. J. B. Thomson announcing the death of Mr. Joseph Thomson, and from Mr. and Mrs. Thomson and family in response to a letter of sympathy forwarded to them on receipt of Mr. J. B. Thomson's letter.

From M. du Fief, of Brussels, giving a description of a large and beautiful map of the Congo published by him, a copy of which he has kindly presented to the Society.

From Mr. G. Jervis, of the Royal Industrial Museum of Turin, which was accompanied with a copy of schematic works prepared by his father, the late Lieut.-Col. J. B. Jervis, for the use of cartographers and others.

From Mr. R. V. Douglas, of the British Museum, referring to the beautiful Pali MSS. presented to the Society by Captain Unsworth.

From Dr. L. Jacobowski, Herr Carl Flemming, of Glogau, and from Dr. G. W. Leitner, on "The Future of Chitral and the Neighbouring Countries," with maps, etc.

The presentation to the Society of a considerable number of gifts was announced. Particulars of these and other gifts will be found in the list of additions to the library.

The election of the following new members of the Society was announced:—

ORDINARY: Messrs. J. Morris, junr., James Cheetham, John Haughton, Alfred Hutchins, J. S. Deakin, Captain Buchanan, Mr. F. C. Smith, Miss Matilda Piggott, Messrs. L. Howell, Joseph Hyde, Charles Edward Reade, Leonard Tatham.

LIFE: Mr. A. H. Sykes, Mr. Thomas Kay.

Mr. W. B. TRACY addressed the Society on "The Manchester Ship Canal, from 1712 to 1895," illustrating the address with maps, diagrams, and a large number of fine lantern views.

The address, in which Mr. Tracy sketched the history of the Ship Canal idea, and afterwards recalled the circumstances of its origin, gave some account of the construction of the great waterway. He then passed on to consider the conditions under which the undertaking took hold of the people and was determined upon, and ended with an account of the present position and prospects of the canal. The progress, he said, was continuous, but the nature of the work did not admit of a daily register. Even friends must wait for results. No month had passed yet without solid advance in some important direction. The address was listened to with very great interest.

During the evening several selections of music were given by members and their friends.

Very hearty thanks were tendered to Mr. Tracy and to the musicians, and a most interesting meeting closed.

The 355th Meeting of the Society was held in the Library, Wednesday, October 16th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

The Rev. W. WESTON, formerly British Chaplain in Japan, addressed the Society on his "Travels in Japan." This was a most interesting address,

illustrated by a large number of lantern slides from photographs taken by Mr. Weston during his long residence in Japan. Mr. Weston's description of his journeyings in the mountainous parts of Japan, and of the manners and habits of the people in parts of Japan not usually visited by Europeans, was given with lucid and graphic power.

The views of Fusi Yama were most beautiful, and the address was listened to with rapt attention.

The address was all too short, and a desire was expressed by several members that Mr. Weston should on another occasion resume the account of his experiences.

Very hearty thanks were given to Mr. Weston, who responded by saying that at another opportunity he would be glad to give another address.

The 356th Meeting of the Society was held in the Library, Monday, October 21st, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL in the chair.

The minutes of meetings, October 7th (354) and October 13th (355), were read and approved.

A number of presents were announced (see additions to Library).

The election of the following new members was announced:—

ORDINARY: Mr. H. Welter, Rev. J. Mannins, Mr. D. L. Hamilton, F.R.C.S., Mr. W. R. Hesketh, Mr. R. Thomson, Mr. James Naylor, Mr. J. Magson, Mr. A. H. Brashaw, Mrs. McDowell.

ASSOCIATE: Mrs. Stout.

A communication on "The Transit of Mercury," November 11th, 1894, from Mr. J. P. Thomson, F.R.S.G.S., etc., was read.

The CHAIRMAN reported his attendance at the Lancashire and Cheshire Union Annual Meeting, and described the work now being done, particularly in examination and in promotion of circulating libraries in the villages by the Society.

The SECRETARY reported on the Yorkshire Mechanics' Union, and described the splendid work done by the Union for the various institutes in Yorkshire. He also mentioned that at the Annual Meeting a portrait in oil was presented to the Secretary (Mr. Frank Curzon) by a number of subscribers in celebration of his long and useful work as Secretary; and he also described the very pleasant excursion through Yorkshire dales on the second day of the Annual Meeting.

The CHAIRMAN described the meeting in London of the International Geographical Congress, referring to some of the papers, to the personality of the distinguished scientific geographers, to the fine exhibition of geographical MSS., books, maps, atlases, instruments, and curiosities; to the various invitations given to the delegates, and to the excursions made. He reported that the proceedings of the Congress would be duly placed in the Library for the use of the members, and laid on the table a number of casual papers, etc.

The SECRETARY then described the proceedings of the British Association at Ipswich. He gave a description of this fine old Flemish town, exhibited etchings and photographs of some of the characteristic buildings, mentioned the fine churches and remains, round towers and castles, in the town and district, the carved posts at the corners of some of the streets,

and other interesting things; described the splendid museum for which Mr. J. E. Taylor (who has died since the meeting), formerly of this city, and at one time editor of *Science Gossip*, did so much, and referred to the improvements of the tidal river, the great manufactories, particularly those of the agricultural machine makers, and the wonderfully beautiful parks lying within a few miles all round the town. He then described the work of the Association, and particularised the work in Section E, and called the attention of the members to the various committees, with whose work they were invited to associate themselves. He described the meeting as not an overcrowded one, but as very pleasant, and the hosts as most kind and generous. The work of the Delegates' Committee was referred to, and papers were placed on the table, which the members were respectfully requested to examine, and to give such assistance as they might find themselves able to do.

The Reports were all very full of interest, and considerable discussion ensued.

Thanks to the delegates were proposed by Mr. SNADDON, seconded by Mr. IRLAM, supported by Mr. J. HOWARD REED and others, and were carried.

The CHAIRMAN, in responding, gave a description of the reception of Chief Khama with the sub-chiefs at the Town Hall, and expressed regret that further opportunity for the members to see these distinguished African chiefs, owing to the shortness of time at their disposal, was not possible.

The 357th Meeting of the Society was held in the Library, Wednesday, October 30th, 1895, at 7-30 p.m. In the chair, the Rev. S. A. STEINTAL, F.R.G.S.

The Minutes of the Meeting held October 21st (356) were read and approved.

Letters from the Lisbon Geographical Society, announcing a celebration in 1897 of Vasco da Gama's work.

From Mr. W. S. Bruce, on a proposed scientific and commercial expedition to the Antarctic.

From Lieutenant F. E. Younghusband, and from the Royal Geographical Society of Australia, Brisbane Branch, were read.

Mr. C. H. BELLAMY, F.R.G.S., addressed the Society on a recent visit to Italy. The address was illustrated with a number of fine photographs, some photographs lent by Mr. Paton, and with a considerable series of fine lantern views.

Mr. WILDE, Chevalier FROEHLICH, Mr. E. W. MELLOR, the CHAIRMAN, and others took part in a lively discussion of the subjects mentioned in the address.

A very hearty vote of thanks was given to Mr. Bellamy for his most interesting address.

Mr. BELLAMY briefly responded.

The 358th Meeting of the Society was held in the Library, Monday, November 4th, 1895, at 7-30 p.m. In the chair, Mr. MARK STIRUP, F.G.S., Vice-Chairman of the Council.

Mr. OSMOND W. JEFFS, a distinguished Liverpool geologist addressed the Society on "Our British Scenery: Its Characteristics and Origin." (See page 265.)

Mr. Jeffs is the Secretary of the Committee of the British Association appointed to collect typical geological photographs of Great Britain and Ireland. This magnificent collection has been housed at the Geological Museum, Jermyn Street, London, and in illustration of his admirable address, Mr. Jeffs was able to place the collection under contribution.

The address was one of great value from either a scientific or an artistic point of view, and the slides were very much admired.

A lively discussion ensued, in which many members took part.

Very hearty thanks were tendered to Mr. Jeffs for his able address.

Mr. JEFFS responded, and thanked the Society for some beautiful photographs sent to the Committee by the Victorians of the Society.

The 359th Meeting of the Society was held in the Library, Wednesday, November 13th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The Minutes of Meetings held October 30th (357) and November 4th (358) were read and approved.

A large number of presentations to the Society was announced, and they were exhibited on the table in the Library and on the sides of the room.

The election of the following members was announced:—

ORDINARY: Mr. Thomas Ward, F.R.G.S.; Mr. L. Samter.

ASSOCIATE: Mr. A. V. Wallwork.

Mr. MARK STIRRUP, F.G.S., F.I.Inst., addressed the Society on "The Underground World; or, The Work of the Subterranean Waters."

Mr. Stirrup described in brief the theories of the circulation of underground waters, and then carefully reviewed the work of M. Martel, of Paris, and his friends, in cave exploration on the Continent, and referred to his recent visit to some of the English and Irish water-worn caves. Mr. Stirrup exhibited some slides made from M. Martel's photographs, and a few slides which the Victorians had prepared of views and diagrams (which they had re-drawn for the purpose) of Ingleton and Castleton caves. A very interesting address was given by Mr. Stirrup.

A number of questions were put and replied to by him.

The CHAIRMAN moved, and Mr. JACOBY seconded, a very hearty vote of thanks to Mr. Stirrup for his address.

Mr. STIRRUP responded.

A complete collection of M. Martel's papers is in the Library.

The 360th Meeting of the Society was held in the Library, Monday, November 18th, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The minutes of meeting held November 13th (359) were read and approved.

A letter from Mr. J. Scott Keltie on an intended interview with the First Lord of the Admiralty on the question of Antarctic research and the appointment of a delegate to attend for this Society was read.

The Secretary was requested to write Major General Sir Francis de Winton to represent the Society.

Mrs. Bishop's letter from Moukden on the "Holy City of the Manchus" was read.

An announcement of the publication of Lieut.-General Wauwerman's "L'Ecole Cartographique Belge et Anversoise du XVIIe Siècle" by the Antwerp Geographical Society was read, and the attention of the members was called to the great value of this fine piece of scientific research. The book is largely illustrated.

A letter from Mr. W. S. Bruce was read on a projected Antarctic expedition in 1897.

The Rev. Canon SYMONDS addressed the Society on "A Short Visit to the Ægean Sea."

The Rev. Canon mainly traced the supposed route of Ulysses and one or two of the voyages of St. Paul.

The personal visit of the Canon enabled him to deal very graphically with the various points of interest, and his description of Mont Athos was of particular value.

The address was illustrated with charts, and a number of slides specially prepared by the Victorians, and some others.

A good many questions were asked, and discussions on various interesting points took place.

Dr. BLACK, Edinburgh (who has also visited the Eastern Mediterranean), moved a hearty vote of thanks to Canon Symonds for his scholarly, lucid, and instructive address. Mr. J. D. WILDE seconded the resolution. Mr. H. KIRK and others supported it, and it was carried.

Canon SYMONDS responded.

The 361st Meeting of the Society was held in the Library, Wednesday, November 27th, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The Minutes of Meeting held November 18th (360) were read and approved.

Letters from Col. W. W. Mawson, the Rev. W. Weston, Mr. H. T. Crook, Mr. T. H. Elliot (Secretary of the Board of Agriculture), and from Mr. J. S. Keltie were read.

Mr. J. C. BLAKE, F.R.G.S., F.I.Inst., addressed the Society on "A Baltic Voyage: Notes of Travel."

Mr. Blake described the voyage, giving some account of the places touched at, and entering into considerable detail about St. Petersburg and Moscow. Mr. Blake had purchased a large Russian wall map of Moscow, which he had had mounted and presented to the Society. He also exhibited a number of large Russian coloured photographs.

Mr. W. H. Williamson also lent for the occasion several books of photographs of the Baltic, St. Petersburg, and Moscow. The photographs were very beautiful, and a considerable number were of large size. They added very much to the interest.

Mr. Glossop kindly lent a large number of his photographic slides from photographs taken by himself and friends.

The address was very interesting, and was of very great value to any members who may be intending to take the same voyage.

A large number of questions were asked, to which Mr. Blake replied.

At the close, very hearty thanks were given to Mr. Blake for his address and for the gift of the fine map of Moscow, to Mr. Williamson for the loan of his photographs, and to Mr. Glossop for the loan of his slides.

Mr. BLAKE responded.

The 10th Annual Meeting of the Society was held in the Library, Monday, December 2nd, 1895, at 7-30 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., F.I.Inst., Chairman of the Council, in the chair.

The SECRETARY read several letters of apology for absence at this meeting.

The Minutes of the last Annual Meeting were read and approved.

The CHAIRMAN addressed the Meeting on the work of the Society during the past year; referring to the new rooms of the Society, and the great comfort in working from their acquisition, and mentioning that a small balance still remained to be provided for the Furnishing Account; to the series of addresses given to the Society, and to the lecturing and other work of the Victorians; to the work of the Education Department; and to Mr. A. J. Herbertson's work at Owens College.

He then referred to the large number of members lost to the Society by death, and particularly referred to the deaths of Mr. Hilton Greaves, Mr. B. O'Connor, Mr. Thompson, and Bishop Maples. He referred also to the International Geographical Congress in London, and to the Geographical work at the British Association, and especially to Mr. Crook's work in relation to the Ordnance Survey. The large correspondence of the Society with individuals and with foreign societies was referred to, and the aid the Society had given to a large number of members in their foreign travel.

He urged the necessity for a large addition to the membership of the Society, and trusted the members themselves would deal with this matter in a persistent and generous way.

The SECRETARY then submitted the Report of the Council and the Balance-sheet for the year 1894, and Mr. J. HOWARD REED submitted the report of the Victorians. (See page 91, vol. xi.)

The CHAIRMAN moved the adoption of the reports and balance-sheet. Mr. M. STIRRUP seconded the motion, which was unanimously adopted.

A letter from Mr. J. Howard Reed on the Victorian work was read, which added further particulars of the work done by them in reference to the analysis of journals, in photographic work, map drawing, and in several other ways.

Mr. STIRRUP moved that the thanks of the Society be tendered to the Victorians for the work done by them during the year. Mr. H. T. CROOK seconded, and the motion was carried.

Mr. CHIVERS moved a vote of thanks to the Council for their services during the year. Mr. WALMSLEY seconded the resolution, which was passed.

Professor T. H. CORE moved a vote of thanks to Mr. J. H. Reed for his services as Honorary Secretary to the Victorians, and to Mr. S. Oppenheim for his valuable services as Honorary Treasurer; Mr. A. Y. SCHOLFIELD seconded the resolution, which was carried.

The following, on the motion of Mr. WALMSLEY, seconded by Mr. SCHOLFIELD, were elected the Council and officers for the year 1896:—

PRESIDENT.—His Royal Highness the Duke of York, K.G.

VICE PRESIDENTS.—His Eminence Cardinal Vaughan, His Grace the Duke of Devonshire, K.G., the Right Hon. the Earl of Derby, G.C.B., the Right Hon. Lord Egerton of Tatton, the Right Rev. the Lord Bishop of Manchester, the Right Hon. the Lord Mayor of Manchester, His Worship the Mayor of Oldham, His Worship the Mayor of Salford, His Worship the Mayor of Eccles, the Vice-Chancellor of the Victoria University and Principal of Owens College, the Right Rev. Monsignor Gadd, V.G., the Right Hon. Sir James Fergusson, Bart., C.I.E., M.P., the Right Hon. A. J. Balfour, M.P., the Right Hon. Jacob Bright, Sir W. H. Houldsworth, Bart., M.P., Sir Humphrey F. de Trafford, Bart., Sir F. Forbes Adam, C.I.E., Mr. F. Cawley, M.P., Alderman Sir Bosdin T. Leech, J.P., Alderman Sir Joseph Leigh, Sir Frank Lockwood, Q.C., M.P., Mr. B. Armitage, J.P. (Chomlea), Mr. Gilbert Beith, Professor W. Boyd Dawkins, M.A., F.R.S., Mr. J. Thewlis Johnson, Mr. Henry Lee, J.P., Mr. G. Lord, J.P., Mr. William Mather, Mr. Samuel Ogden, J.P., Mr. Herbert Philips, J.P., Mr. H. J. Roby, Mr. C. E. Schwann, M.P., Mr. C. P. Scott, M.P., Rev. S. A. Steinthal, F.R.G.S., F.I.Inst. (Chairman of the Council), Mr. T. R. Wilkinson (Vice-Consul for the Ottoman Empire).

TRUSTEES.—Mr. James Parlane, J.P. (Consul for Paraguay), Mr. Sydney L. Keymer, F.R.G.S., Councillor S. H. Brooks, F.I.Inst.

HON. TREASURER.—Mr. S. Oppenheim (Vice-Consul for Austria-Hungary).

HONORARY SECRETARIES.—Mr. F. Zimmern, Mr. J. D. Wilde, M.A.

HON. SEC. "VICTORIANS."—Mr. J. Howard Reed, 56, Ducie Grove, Manchester.

COUNCIL.—Mr. J. E. Balmer, Mr. C. H. Bellamy, F.R.G.S., Mr. J. C. Blake, F.R.G.S., Mr. G. T. Bowes, Mr. Frederic Burton, the Very Rev. L. C. Casartelli, M.A., Ph.D. (Rector of St. Bede's College), Professor T. H. Core, M.A. (Owens College), Mr. H. T. Crook, C.E., Miss Day (Girls' High School), Mr. Thomas Dentith, Chevalier Robert Froehlich, K.C.I. (Italian Consul), Mr. J. E. King, M.A. (High Master Manchester Grammar School), Mr. Joseph Hall, M.A. (Head Master Hulme Grammar School), Lady Bosdin T. Leech, Mr. J. T. Ogden, F.R.G.S., F.I.Inst., Mr. R. C. Phillips, Mr. J. Howard Reed, Mr. Fritz Reiss, Councillor William Sherratt, J.P., Mr. Mark Stirrup, F.G.S., F.I.Inst. (Vice-President Manchester Geological Society, Vice-Chairman of the Council), Mr. W. Angelo Waddington.

HONORARY AUDITORS.—Mr. William Aldred, F.C.A., Mr. Theodore Gregory, F.C.A.

Thanks were proposed and seconded and carried for the services of the Chairman to the Society, and for presiding at this meeting.

The CHAIRMAN responded.

The 362nd Meeting of the Society was held in the Library, Wednesday, December 11th, 1895, at 7-30 p.m. The Rev. S. A. STEINTAL, F.R.G.S., in the chair.

The Minutes of Meeting held November 27th (361) were read and approved.

The presentation of a number of books, maps, etc., was announced, and a number of the presentations were exhibited.

The election of the following members was announced:—

ORDINARY: Mr D. McKegg, Mr. F. A. Pickering.

AFFILIATED SOCIETY: The Leigh Technical Schools and Free Library.

Mr. F. W. W. HOWELL, F.R.G.S., addressed the Society on his "Explorations of the Icelandic Glaciers and Lands" during the year.

The address was most interesting, and was illustrated with a fine series of lantern views, made from Mr. Howell's photographs taken by himself on his journey.

The address was in continuation of the five given to the Society last year, and was very well received.

Mr. Howell is this year giving five or six lectures to the Society and to the corresponding societies, and the new, fresh, and interesting information conveyed by him is of great value.

Mr. KNIGHT moved, Mr. S. OPPENHEIM seconded, and the motion was supported by Mr. A. J. HERBERTSON and others, that the thanks of the Society be tendered to Mr. Howell for his admirable address given that night, and for his kindness in giving the other address to the branches of the Society.

The resolution was carried, and Mr. HOWELL briefly responded.

The 363rd Meeting of the Society was held in the Library, Wednesday, December 18th, 1895, at 7-30 p.m. Dr. RICHMOND in the chair.

The Minutes of the Meeting held December 11th (362) were read and approved.

Letters were read from Messrs. Makinson and Co., from Mr. Elijah Helm, and from Messrs. Keltie and Mill, Hon. Secs. of the 6th International Congress of Geography, held in London, in reference to the Report of the Congress.

The birth of another son to H.R.H. the President having been announced, the CHAIRMAN proposed and Mr. C. H. BELLAMY seconded a resolution of congratulation to H.R.H. the Duke of York and H.R.H. the Duchess of York, and the Secretary was requested to convey the resolution.

Mr. EGBERT STEINTHAL addressed the Society on "Rothenburg," which he described as a quaint and almost unspoiled mediæval South German town.

Mr. Steinthal illustrated his address with a large collection of photographs and of water-colour sketches made by him in his residence in that old city.

The address was listened to with great interest, and a good many inquiries were made which Mr. Steinthal answered.

Mr. HERBERTSON moved that the thanks of the members be given to Mr. Steinthal for his charming address. The resolution was seconded by Mr. CHURCHILL and supported by Mr. C. H. STOTT and others, and was carried.

Mr. STEINTHAL responded, and then spent a good deal of time in giving further information and in detail description of the photographs and drawings.

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The 364th Meeting of the Society was held at the Society's House, Monday, December 23rd, 1895, at 6 p.m. The Rev. S. A. STEINTHAL, F.R.G.S., in the chair.

The Minutes of Meeting held December 18th (363) were read and approved.

Letters from Mr. W. N. Greenwood, Dr. Max Ohnefalsh-Rutter, Alex Fedotoff, of Orechovo were read.

A letter, thanking the Society for their congratulations on the birth of a prince, was read from Major-Gen. Sir F. de Winton, on behalf of their R.H. the Duke and Duchess of York,

A long and pleasant evening, with readings, music, and some short addresses, was then spent; Mr. J. HOWARD REED taking the opportunity of referring to the work of the "Victorians."

Very hearty thanks were given to those who had made such excellent provision for the members, to the lanternist, and to the members and friends who had provided the excellent musical selections.

The 365th Meeting of the Society was held in the Library, Friday, December 27th, at 6-30 p.m. Mr. J. D. WILDE, one of the Honorary Secretaries, in the chair.

The SECRETARY addressed the children of the members on "Geography in Pictures," and made the lecture interesting to the children by a number of pictures and photographic slides.

The lecture was listened to with pleasure, and the lecturer was thanked.

NEW BOOK.

INDUSTRIAL EXPLORINGS IN AND AROUND LONDON. By R. ANDREWS.

With nearly 100 illustrations by T. M. R. Whitman. Second Edition. 296pp. London: James Clarke and Co.

A PLEASANT, chatty description of work done in London—piano-making, roperies, tramland, candle, gas, paper toys, mineral water, match-making, rubber works, wire-drawing and weaving, and last, sweetland, are all described.

The book is not intended to be more than generally descriptive from an outsider's point of view, and does not abound with statistics.

A very good idea is, however, given of the various operations. The illustrations, as well as some part of the writing, are humorous, and the little volume is a pleasant record of the writer's visits to the manufactories and industries indicated.

THE JOURNAL

OF THE

MANCHESTER GEOGRAPHICAL SOCIETY.

THE WORK OF THE PALESTINE EXPLORATION FUND.

By LIEUT.-COL. C. M. WATSON, C.M.G., R.E.

[Addressed to the Society, in the Memorial Hall, November 16th, 1894.]

COLONEL WATSON said that when he was asked by your Secretary to give a lecture on the objects aimed at and the work done by the Palestine Exploration Fund, he was at first rather doubtful how it would be best to treat the subject without, on the one hand, giving either an unnecessary amount of detail or omitting important points. If, therefore, any of those present should think that he erred in one direction or the other might he ask them to forgive him, realising that it was important for those who had not given any previous attention to the matter, that he should discuss some points which were familiar, doubtless, to others who were there that evening.

To them all the Bible was the most important and most interesting book in the world, and yet many were apt to regard it as something written so long ago that the events described in it were scarcely realities such as were recorded in histories of recent date, and, whilst regarding it with the greatest veneration, they almost forgot that, apart from its religious character, it was the story of events which actually happened, and that it dealt with the lives of real people and the description of real places.

Fifty years ago this child-like reverence for the Bible was perhaps even more universal than at present, and any attempt to elucidate the study of it by other means than a perusal of the book itself was regarded by a section of religious people with a certain amount of suspicion. This feeling had altered, and those who cared most for the Bible and were convinced of the truth of what was within its sacred pages were the most anxious to

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have every additional light thrown upon the countries of which it treated.

It was this desire for more accurate information about the Holy Land which led to the establishment of the Palestine Exploration Fund twenty-nine years ago, at which time "Smith's Dictionary of the Bible" had appeared, giving a resumé, in articles written by the most qualified authors, of all that was known of the Holy Land—its sights, its geography, and natural history up to that date.

Other well-known authors, such as Dean Stanley, had also published works upon the subject, which showed to careful readers how little was known and how much there was to investigate.

Some of those persons, who felt that a careful and scientific examination of the country would lead to important results, formed themselves into a small committee under the presidency of the late Archbishop of York, Dr. Thomson, with the view of setting on foot such an exploration. The objects which the committee specially aimed at were the following: (1) To make a really accurate survey of Palestine, showing the physical features and marking the exact positions of every place where ancient remains were to be found, thus forming a basis for the identification of the sites mentioned in the Bible. (2) Carefully to explore the remains of ancient buildings, with a view to the discovery of inscriptions. (3) To study the manners and customs of the people, which, as was well known, altered so little in Eastern countries. (4) To examine the geology, zoology, botany, and meteorology of the countries both east and west of the Jordan.

In order to carry out these objects effectually and to prevent any question arising as to the value of the results obtained, it was decided that all work carried out by the fund should be based on the following conditions: (1) It should be carried out on strictly scientific principles. (2) That the society should as a body abstain from controversy. (3) That it should not be started, nor should it be conducted, as a religious society.

These conditions have always been carefully adhered to, and it was a matter of congratulation that no disputes had arisen regarding the statements put forward by the society as authentic. The committee thus set on foot gradually increased in size by the addition of new members who were interested in the subject, and as it became too numerous for effective working a small executive committee was appointed. This latter committee meets twice a month, and conducts the ordinary business of the society, while the general committee meet once a year only to receive and discuss the annual report.

At the annual meeting the members of the Executive Committee resigned, but were eligible for re-election.

The society has no Royal charter, but in order to have the power of defending its copyright, and of holding property, it was organised as a limited liability company, with a small number of shareholders, who received no profits. To give the names of those who had been members of the general committee of the Palestine Exploration Fund would be to quote the names of a majority of those persons in England who were interested in biblical research. From the first the committee had worked together with the greatest cordiality and unanimity, all having one common object in view, the carrying out, in the most effective manner, of the work of the society.

The third condition, which he had already given, had prevented the fund becoming the organ of any particular religious body. It numbered among its supporters Jews as well as Christians, and Christians of every denomination, Protestants, Roman Catholics, members of the Greek Church, Nonconformists, and Unitarians. Questions of doctrine and ecclesiastical discipline were excluded from the publications of the society. The bond of union was the Bible and the history of the Holy Land.

The offices of the society were at 24, Hanover Square, London. There, also, were the various objects which had been collected in Palestine, and a small but excellent library of works bearing on the subject. The collection would form the base of a museum of biblical archæology, which it was hoped might some day be established. Any person who was interested in those matters should take an opportunity of calling at the office, where he will be shown the collection by the Secretary, Mr. George Armstrong, who has himself a very intimate knowledge of Palestine, having been employed there for many years, and is a sergeant in the corps of Royal Engineers.

As soon as the committee was established, funds were required to carry out the objects of the society, and an appeal to the public was generously met. Over £90,000 had been received since the commencement of the work, of which about £60,000 had been spent on exploration, £14,000 on management, and £26,000 on maps and publications, while the society had a considerable property in its collections and copyrights. The system of local societies with honorary secretaries had been of the greatest help, not only in bringing in subscriptions, but they gave invaluable assistance in spreading the information gained by the discoveries of the fund.

In order to carry out the work on scientific principles the Government was asked to lend the services of officers of the Royal Engineers, and the first selected were Captain Wilson, now known to us all as General Sir C. Wilson, and Lieutenant Anderson, who went out in 1886 to make a preliminary reconnaissance of Palestine from north to south. A large number of biblical sites, including one which had the strongest claim to be

regarded as Capernaum, were carefully examined. Many plans of ancient buildings were made, and about fifty points were fixed astronomically. Much more, in fact, was done in the first two years than had been anticipated.

The next work undertaken by the fund was an examination of the ground at Jerusalem, and this was entrusted to Lieutenant Warren, R.E., now General Sir C. Warren, who spent about two years at Jerusalem, and carefully investigated the walls and foundation of the Temple enclosure. The excavations, carried on under great difficulties, fully proved the gigantic nature of the buildings. The vast wall, now covered with rubbish in places more than 100ft. in depth, stood up from the valley of the Cedron to a height of no less than 200ft., above which again towered the great building of the Temple itself, and the magnificent cloisters that surrounded it. Warren's researches proved that the Tyropean Valley, alluded to by Josephus, now filled with rubbish 60ft. deep in places, was west of the Temple. All the discoveries tended to confirm the statements made by Josephus, who had been thought to have exaggerated the glories of the Jewish capital.

The preliminary investigation showed the absolute necessity of completing an accurate map of Palestine as a basis of research, and in 1872 Lieutenant Conder, R.E., now Major Conder, was sent with a party of Royal Engineers to make a survey of the country west of the Jordan, which was finally completed in 1878 and published on a scale of one inch to the mile; and a reduced map, on a scale of eight miles to three inches, which was sufficiently large for ordinary readers, had also been issued. On this map were shown all the biblical sites so far as they had been identified, and also the sites mentioned in the Apocrypha and in Josephus. To students of the Bible this map was of very great value. Within the last year a raised map of Palestine on the same scale had been completed by Mr. Armstrong, showing accurately all the physical features of the country, and giving a better general idea of the nature of the Holy Land than any publication ever before issued. A copy of this raised map should be in every public library and educational institution. It was proposed also to survey the country east of the Jordan, but owing to various circumstances a portion only had been completed.

Now that the survey of Palestine had been published the traveller could examine the country in a manner which was quite impossible prior to the existence of the Palestine Exploration Fund. He was formerly quite in the hands of his dragoman, as no reliable map was to be had, and probably in many cases returned to England with very erroneous impressions. In nothing was this more marked than in the matter of the identification of ancient sites, many of which

were quite unknown. In the Bible there were 622 names of places mentioned west of the Jordan. Of these 262 were known before the survey, and no less than 172 additional were identified during the progress of the work. Before leaving the question of sites there was one point he should like to mention, which was that site upon which Jewish, Christian, and Mohammedan tradition agreed might be accepted as authentic. For instance, there was probably no more doubt that Abraham and Sarah, Isaac and Rebekah, Jacob and Leah were buried in Hebron, than that the Duke of Wellington was buried at St. Paul's. The tomb of Rachel, near Bethlehem, the position of Jericho, and some others were undoubted, whereas other sites such as that of the Holy Sepulchre, were not only doubtful, but might always remain so. He hoped in fact that the exact site never would be ascertained, for it was the fact of their Lord's resurrection, and not the site, that was all important.

Although the great survey of Palestine had been the most important work yet undertaken by the fund, other discoveries of the greatest value had been made. The examination by the late Professor Palmer of the desert, of the wandering of the Israelites, the archæological researches of Mr. Clement Ganneau, now shortly to be published, Major Conder's discoveries in the land of the Hittites, the investigations by Mr. Shick and others of Jerusalem, could not be passed by without mention. The most interesting recent work done by the fund had been the exploration of the mound known as Tel-el-Hesi, probably the site of the city of Lachish, which was taken by Joshua. This exploration, commenced by Professor Petrie and completed by Mr. Bliss, had shown that in the ancient hill no less than eight cities existed, one on top of the other, of which the most ancient dated about 2,000 B.C., and the last about 400 B.C. Probably it was the third or fourth of those towns which was captured and destroyed by Joshua.

In the third town, which dated about 1,500 B.C., Mr. Bliss found a clay tablet, inscribed with cuneiform characters, which must have been written before the Israelites left Egypt, and was the oldest written document yet found in Palestine, and might be the precursor of the discovery of others, because it should be remembered that Tel-el-Hesi was only one of many hundred similar Tels scattered through Palestine. A book describing these most interesting explorations has been published this week. He would now like to say a few words as to the work which they proposed to undertake in the immediate future. After a very long correspondence the committee had, within the last few days, been granted a firman by the Sultan for recommencing excavations at Jerusalem, and instructions had been sent to Mr. Bliss to commence work as soon as possible. The places, then, at which he would probably com-

mence was on the south of the town, with a view to tracing the ancient wall from Mount Zion to Ophee, and to examining the latter hill, which was undoubtedly the most ancient part of Jerusalem, probably the city of David. No more interesting spot for excavation could possibly be imagined, and it was to be hoped that important results would follow. Money was much needed, as what could be done was done entirely in proportion to the amount of funds available. They were very anxious to increase the number of annual subscriptions, as the funds which could be relied on from year to year were much more useful than donations. Considering that for a subscription of 10s. 6d. a subscriber got free the quarterly statement, giving a vast amount of information, available in no other form, and is also entitled to get the maps and other publications at a reduced rate, it is to be hoped that as the objects of the fund get better known the number of subscribers may largely increase. We also badly want money for the publication of various MMS. in the hands of the committee, which are of good value, but which it had not been possible to bring out hitherto for want of funds. He wished that more people would go out to Palestine and see the country for themselves. Many who did so became subscribers on their return, but he did not advise any one to do so without due consideration, reminding the council of Count Eberhard of Wurtemberg that Brother Felex Fachi-cho consulted him before making his well-known journey to the Holy Land 400 years ago. There are three acts in a man's life that no one ought to advise another to do or not to do. First, is to get married. Second, to go to the wars. Third, to visit the Holy Sepulchre. These three acts were good in themselves, but they might easily turn to evil, and then he who gave the advice was blamed as if he were the cause of the ill. But, at the same time, a visit to the Holy Land was an act which, to those who undertook it with a view to the praise of God, may be very praiseworthy and exceedingly useful; while it might be full of peril to those who made it out of frivolity and vain curiosity.

Colonel Watson exhibited fine lantern views of the historic sites in the Holy Land and of the various explorations in the City of Jerusalem, which went far to illustrate what the Committee of the Palestine Exploration Fund had accomplished. He also exhibited a beautiful raised map of Palestine, which, he said, was well calculated to give a general idea of the country. He pointed to the depression of the Jordan, the Dead Sea, the sites of Jerusalem, Jaffa, and Mount Carmel.

* * This address Colonel Watson very kindly repeated at the Oldham Free Library, on Saturday evening, to a very large audience.

NOTES OF A JOURNEY IN SOUTHERN SPAIN AND
TANGIER IN 1895.

By J. C. BLAKE, F.R.G.S., F.I.Inst.

WE left Tilbury, September 29th, 1895, in the evening by the *Midnight Sun*, 3,178 tons horse-power, for a twenty-three days' cruise, calling at Lisbon, Cadiz, and Tangier on the way. Our floating home for the time being was fitted out with all modern conveniences. A steam launch for landing passengers was carried. The *Midnight Sun* is a good, steady boat; seven times round her deck equals the length of one mile, the upper deck forming a promenade over the entire length of the ship, with uninterrupted view to either side, whilst above the deck-house is another promenade of considerable size.

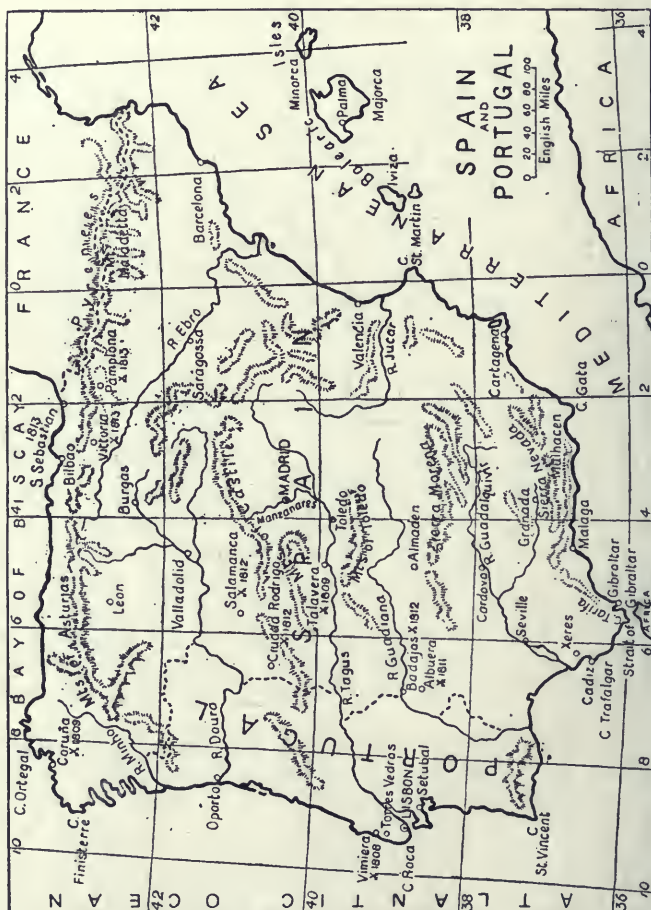
Soon after leaving Tilbury we assembled for dinner, numbering 162, after which a recreation committee, which included ladies, was elected by the passengers, to the number of twelve, whose duties consisted of organising entertainments during the cruise. We had concerts and other miscellaneous entertainments, tableaux vivants, conjuring, ventriloquism, etc., and each evening during the cruise tournaments in chess, whist, and draughts. During the day we had deck quoits, cricket, and deck billiards, and at intervals of a few days had competitions on deck for small money prizes in the usual ship's games, such as egg and spoon races for ladies, obstacle races, cock-fighting (with men, not live birds), slinging the monkey, etc.

The morning after our departure was beautifully bright and sunny with a calm sea, and on going on deck after breakfast we found ourselves steaming at the rate of about 13 knots past Beachy Head. In the afternoon we were favoured with an entertaining lecture by Sir Lambert Playfair, K.C.M.G., Consul General at Algiers, "On the Mediterranean,"* the lecturer, as editor of "Murray's Handbook to the Mediterranean," being an authority on the subject.

On the morning of the third day out we entered the Bay of Biscay, but beyond a slight roll no discomfort was experienced; the passengers now all settled down, and by degrees we began to know each other. During the day we made steady progress, both wind and weather being in our favour, the evening being agreeably spent by most of the passengers in the dining saloon,

* See "Journal of the Manchester Geographical Society," Vol. VI., p. 244.

where our first concert and variety entertainment was given. This was a great success, as, in addition to good vocal music, excellent solos on the violin and cornet were contributed, and some clever and amusing tricks with cards were given by the ship's surgeon.



A good night's run was succeeded by a pleasant morning and magnificent sea, but we now felt it to be much warmer, and we clothed accordingly. About noon we signalled to the lighthouse on Cape Finisterre, and in the afternoon pass out of the dreaded "bay," our casualties being almost nil. This afternoon we were again favoured with a lecture by Sir Lambert Playfair on the "Ancient History of Carthage."

On the morning of October 3rd we entered the mouth of the Tagus, the weather beautifully fine, but exceedingly warm. After breakfast all assembled on deck, field glasses being extensively resorted to, and pointed to the right bank of the river as we gradually approached Lisbon. The harbour is considered one of the finest in the world, being about 19 miles in length (opposite the city it narrows from a width of about six miles to that of one-and-a-half to two miles), and affords excellent anchorage for shipping. The mouth of the river is defended by two forts, one on each side, but they are not very imposing looking. We passed Lisbon rock with its old castle, and soon after the red sandstone cliffs with hills behind; then passed a few scattered buildings on the right bank, with here and there a white church, and red-tiled villas with trim gardens. Soon after this we rounded a point, and gradually approached the city. It is built on a series of steep hills. We anchored about noon and were at once conveyed ashore by two large steam launches. A very agreeable day was spent in riding through Lisbon. We were surprised at the long line of smart-looking landaus used by our large party, and were no little amusement to the residents, a large number of whom crowded both sides of the leading thoroughfares, whilst many others looked down from windows along the route, evidently unaware of the sudden and unexpected invasion of so many peaceful visitors. The sea-front of Lisbon is extremely picturesque, but the streets are very steep and somewhat narrow, whilst most of the buildings consist of not less than three storeys, with balconies coloured in either blue, green, pink, or buff. The leading thoroughfares are traversed by trams drawn by powerful-looking mules, and the steeper parts of the city are suitably provided with vehicles propelled by electricity, but we were surprised at the comparative ease with which our sleek and slender-built horses made the ascent of these steep and difficult streets without any attempt whatever at stopping for rest.

We visited the Botanical Gardens, containing many fine specimens of a great variety of palms, planted on either side of the main walk. These met overhead in some places, and appeared to form an avenue, affording a welcome shelter from the intense heat of the sun. A beautiful view of the city was had from the upper portion of these grounds. We drove out to the Necessidades Palace, the residence of the King of Portugal, conspicuously situated on the summit of a hill outside the city, but we had not the time to view the interior. We next visited the old Cathedral, containing the remains of St. Vincent, patron saint of Portugal; also the marble church of San Roque, containing a silver chapel, much tarnished, of St. John the Baptist. Here there are a number of very valuable mosaics, copied from the original paintings in the Vatican at Rome, of Guido and

Michael Angelo. The convent at Belem (Bethlehem), with its adjoining Moorish castle, was very interesting, the narrow spiral columns of Moorish origin being particularly fine. These support a gallery in the courtyard, the front being of magnificent fretted stone work, the cloisters extending round the four sides. The convent affords board, lodging, and education for a large number of boys, who were assembled in the cloisters awaiting admission to the dining hall for the evening repast. We were told this consisted of bread and butter and light wine. They were curious-looking little fellows, dressed in jacket and trousers of unbleached coarse linen and caps to match, aged from about eight or ten to fifteen years—very clean, but with extremely sallow complexions. Their large dark eyes appeared to follow all our movements with the most eager curiosity. We also visited the collection of Royal carriages, many of which were of considerable antiquity, one of them having belonged to Vasco da Gama. The carriage of the great navigator was very large and imposing, and in a good state of preservation. Many of them, with the harness, might have been kept cleaned.

Adjoining the building where the Royal carriages are kept is a cavalry barracks, garrisoned by a detachment of Portuguese lancers, who appeared very young, and, like the boys at the convent, dressed in linen jackets and trousers and caps to match, which by no means improved their appearance. Most of the caps were much too large, and in the hot sun gave the men a smothered appearance. Our time being limited we had lunch on shore. In the afternoon we resumed our drive about the city, including the poorer quarters, where we were again the objects of curiosity to the residents, who turned out in large numbers to witness the procession. Lisbon contains numerous monuments erected in the leading squares. The squares were all planted with palms and flowering plants, which were then beginning to fade, but still giving colour to add to the effects of the scene. The sun was rapidly on the wane when we entered the gate of the English cemetery. This has avenues of stately cypress trees. Although it was twilight, we were successful in finding the graves of Henry Fielding and Dr. Doddridge, the latter almost entirely obscured in a geranium thicket. Both had gone out in search of health, but too late, Dr. Doddridge dying soon after landing, and Fielding not long after his arrival. Our last launch left the shore at 11 p.m., a few of the passengers dining ashore and afterwards going to the theatre. Upon their return we weighed anchor, after having spent a most enjoyable day, which was a pleasant and agreeable change to the three previous days at sea. We were now on our way to Tangier, and the following day being Sunday we had service on deck under the awning. We were rather amused at the s.s. Glengarry, bound for the Mediterranean with cargo

and passengers, running close alongside us since breakfast, and at noon, for some unknown cause, she crossed our bow, and ran within 200 yards of us again for several hours. About sunset we passed Cape St. Vincent.

All the passengers now appeared on deck, taking advantage of the pleasures and amusements afforded by a lazy life at sea in a well-equipped seagoing steam yacht.

We reached Tangier about 8 a.m. on October 5th, and were duly boarded by the medical officer, rowed by four stalwart Moors in full native costume with bare feet, and in due course had permission to land. After breakfast we got ashore, our large party being divided into two for convenience in going about. The first half ride out into the country about seven miles in the morning, and explore the town in the afternoon; the second part reversing this order of exploration; the same arrangement being observed for lunch at the Hotel Continental, a good house, and with European cuisine. Our party of about 70 were variously mounted upon horses, mules, and donkeys, the scene at the hotel door when the "order to mount" was given being not easily forgotten, all being crowded together and hemmed in by a multitude of astonished natives, so that would-be riders of both sexes are intermingled with animals of almost every variety of Eastern equipment, in the way of saddles, bridles, stirrups, etc. The patient demeanour of these willing steeds presented a striking contrast to the noisy shouts of their dusky drivers, some of whom have a decidedly suspicious appearance. At last our own immediate party of about 18 are duly mounted and the squadron falls in, headed by a handsome young Moor, named Hamed Bin Mohammed, over 6ft. high, who spoke six languages, having spent some time in London and Paris. This important functionary, upon learning that his uncle, in 1893, on a former visit, piloted me round Tangier, with much ceremony presented his address card, and ineffectually endeavoured to persuade me to mount a handsome little black donkey, which he ultimately selected himself. It proved, as he stated, the fastest animal in the troop and an excellent climber, my own mount being a medium-sized mule with a very high stuffed scarlet flannel saddle, elaborate Spanish stirrups, and a bridle in several pieces joined with string, which ever and anon came undone; until at last, after numerous repairs by the amiable Hamed, I was finally obliged to do without reins altogether, and follow on with the bit hanging out of the animal's mouth, and trust to its natural habit of following the others, which turned out to be much the safest course under the circumstances.

The environs of Tangier are interesting. Our route embraced a gradual ascent of about 500ft. through narrow lanes and gardens, in which were to be seen the plumbago, heath, cistus,

lentisk, bay, laurustina, honeysuckle, yellow broom, dwarf oak, cork trees, etc., in great abundance. Tangier is essentially Moorish, and, with the exception of the Foreign Legations and Consulates, there are but few good houses.

The climate is mild and agreeable, and considered suitable for persons suffering from lung diseases. The streets are narrow and steep. There is no drainage, and the result is an unenviable collection of bad odours, which in no way appear to trouble the natives. In the afternoon we visited the market place, and saw the snake charmers, the prison, bazaars, cafés, and the outside only of the mosques—no Jew or Christian being permitted to enter. From the Kasbah may be seen the coast of Spain in the distance. This fort was erected on the highest part of the town. Tangier contains about 18,000 to 20,000 inhabitants, of whom about 6,000 are Jews, and is under the government of a Basha or Kaid. The province is of considerable extent. In 1662 it was ceded to England as part of the wedding dowry upon the marriage of Catherine of Braganza with Charles II., but in 1684 was abandoned to the Moors on account of the expense. The fortifications were dismantled, and a mole, erected by the English under Lord Teviot, was destroyed before the evacuation of the place. The mole was thirty yards wide, and projected about 300 yards into the sea, the foundations being still visible at low water. At high water in rough weather the surf breaks over it. After a hard day of exploration, under a scorching sun, we were glad in the evening to return to the ship. We left about midnight for Cadiz.

The next morning we breakfasted at 6-30 a.m., and about 120 of us left Cadiz at 8 a.m. by special train for Seville for a four days' land excursion in the South of Spain; whilst the rest of the party spent the day in Cadiz and embarked in the evening for Gibraltar, and from there to Malaga, where they awaited the arrival of the land party. We reached Seville about noon. It is the capital of the province of that name, the seat of an archbishop, and contains a population of about 135,000.

Seville is situated on the left bank of the Guadalquivir, which here flows through a level and very productive country, and is navigable up to the city. The place has a Moorish aspect, with its narrow streets and the fine inner courtyards of many of its houses. The cathedral was completed in 1519; it is very fine, and was built on the site of the ancient mosque, many of the pillars of which still exist outside. The bullring here is considered the next in importance to that at Madrid, and is a spacious building capable of accommodating 18,000 people. Our brief stay prevented our seeing one of these national entertainments, which generally take place either on Sundays or saints' days.

Seville is a place of considerable commercial activity, in addition to its shipping. There is here a royal cigar factory, employing upwards of 4,500 women and girls. Amongst other public buildings may be mentioned the banks, theatres, and archbishop's palace. The palace of San Zelmo, now occupied by the Duke of Montpensier, was formerly the seat of a naval college, founded by the son of Columbus. There are many imposing public squares and beautiful promenades, including that of Las Deleacias, along the river bank below the city, and there are numerous lovely orange groves. There are hospitals and alms-houses, a considerable number of churches in various stages of preservation, a museum, formerly the church and convent of La Merced, in which are stored numerous priceless examples of Murillo and Velasquez, who were both born here, also of several other distinguished members of the Seville school of painting. The Lonja or Exchange, built in 1585, is interesting, and is now used as a library, with 30,000 volumes; many of them relating to early Spanish explorers are still unexamined. On the other side of the river, crossed by a bridge, is the Gipsy quarter of the Triana, whose curious abodes consist of numerous caves excavated in the sides of the hills, many of them appearing to be comfortably furnished in their way, but the people have a lazy and indolent look. The university dates from 1502, but the present buildings were originally a convent, built in 1567, and devoted to its present use on the expulsion of the Jesuits in 1767. Amongst the many beautiful and interesting architectural remains of the Arab invasion of this part of Spain, mention should not be omitted of the Alcazar, a palace excelled in interest and beauty only by the Alhambra of Granada. Commenced in 1181, it was surrounded by walls and towers, of which the Torre del Oro is the only one remaining. Various additions and alterations have since been made, but not always with advantage to the original design. Restorations have, however, been effected as far as possible, and the palace is now a very beautiful example of Moorish work.

The morning after our arrival, the local papers dwelt at considerable length upon the unexpected visit of such a large number of British tourists. We were welcomed in the name of the residents, who congregated in the streets in considerable numbers, and appear to have been a little surprised at the freshness of the ladies' complexions, the tallness of the men, and the extraordinary variety of the headdress of both.

We leave Seville for Cordova, at noon, on October 7th, and arrive about 7 p.m. in the same special train in which we started from Cadiz.

I was one of three who could not be accommodated at the hotel, and we were piloted some distance away to a better kind of inn, of Moorish architecture, with a courtyard in which were

planted bananas, camellias, roses, oleanders, indiarubber plants, geraniums, myrtles, etc. Round the courtyard ran the usual balcony, from which the various bedrooms were entered. They were small but comfortable, very clean, and floored with tiles, and contained a rug alongside the iron bedstead, but no carpet, which, under the circumstances, was not necessary, the heat being so great I was obliged to sleep with the window looking out upon the courtyard wide open, and during the night was occasionally visited by musquitos. At Cordova we were somewhat annoyed by beggars, whose persistency extended as far as the open windows of the dining-room of the hotel, until ordered to move on by the police, but on the whole we were very courteously received.

Cordova is on the right bank of the Guadalquivir, which flows past Seville to the sea. It is another of those once important cities of Europe whose former prosperity has departed. It is approached by a fine old bridge of Roman origin, partially rebuilt by the Arabs in 723, which, although having undergone numerous subsequent repairs, is still an object of considerable interest, but it is much to be regretted that its complete restoration should not be at once taken in hand. Cordova is unmistakably Moorish, both as regards its narrow streets and buildings. The old Royal Palace or Alcazar (of the Moors) is in ruins, one wing only remaining, which is now used as a prison. The chief attraction, however, of this old world city is its magnificent mosque (Arab, *mesjid*), now the cathedral, and generally called La Mesquita. Commenced in 786, it was completed in 793, and covers 52,500 square yards—a larger area than that of any other Christian church, except St. Peter's in Rome, and considerably larger than the two famous mosques of St. Sophia and Suleiman at Constantinople, but deficient in height in comparison with either. It is approached through a very fine courtyard planted with palms, cypress, and orange trees, about 500ft. in length. The exterior is heavy and uninteresting, but the interior decorations are on a scale of the greatest magnificence, and represent every variety of Moorish style and design from the most ancient to that of the Alhambra. The building is quadrangular in shape, measuring 395ft. from east to west, and 356ft. from north to south. This vast area is subdivided by several hundred pillars of porphyry, jasper, and marble—the spoils of Nimes, Seville, Carthage, and other places—into 19 aisles longitudinally and 29 transversely, each row supporting a tier of open Moorish arches, above which is a second tier, the entire height of the ceiling being about 35ft. In the 16th century it was adapted to the worship of the Roman church by the erection of a high altar, the addition of numerous chapels, and the substitution of a modern tower in place of the ancient minaret. We were fortunate in being present during high mass, and listened to the

strains of the beautiful organ—a marked contrast to the Moslem worship for which this remarkable building was constructed eleven centuries before.

We left for Granada by special train about noon on the 9th October, and arrived at midnight after a slow and tedious journey, time in this part of Europe appearing of little consequence. The ascent from Cordova is about 2,000ft., and at times our train had considerable difficulty in making any progress whatever; it came to a stand several times.

Upon arrival we drove about two miles. The party was divided between the Hotel Washington and the Hotel Suelos, both situated in the pleasant grounds of the Alhambra, facing each other, and beautifully sheltered from the hot sun by a magnificent avenue of lofty trees, some of which were sent out from England by the Duke of Wellington.

Granada, 2,400ft. above the sea, pleasantly situated at the foot of several spurs of the Sierra Nevada mountains, some of whose sunny peaks attain an altitude of over 11,000ft., is the most important city in this part of Spain, its former associations rendering it a place of the greatest interest to tourists. It was the Moorish capital for several centuries, during their sanguinary struggles with the Spaniards, and was surrendered by Boabdil to the Spanish sovereigns, Ferdinand and Isabella, on January 2, 1492.

The following morning we fully appreciated the change in the temperature, the invigorating mountain air presenting a striking and agreeable contrast to the intense heat and drought of the plains we had just left.

We spent part of the day at the Alhambra. It is built upon a commanding eminence, covering 35 acres, and consists of a series of buildings, originally commenced in 1248, forming the palaces and strongholds of the Moorish kings. These are enclosed by a strongly-fortified wall, flanked by 13 square towers, the principal entrance being through the Puerta de la Justicia.

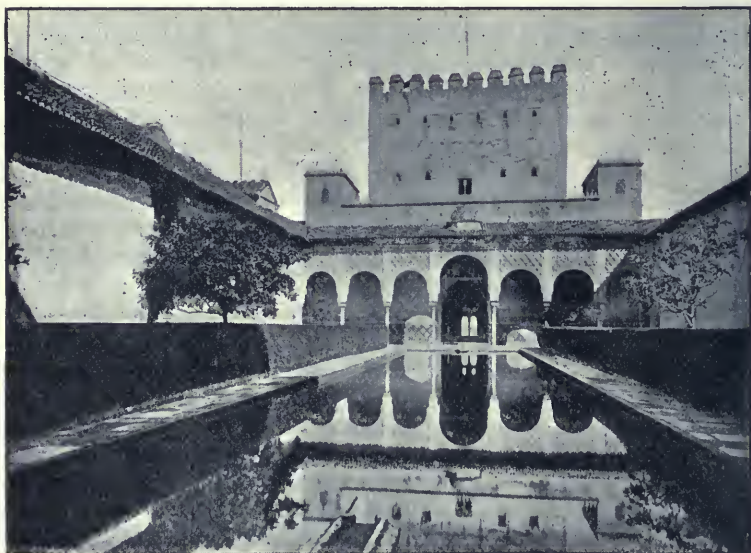
To the left of the Plaza, 225ft. long by 187ft. wide, is the Alcazaba, the ruined fortress of the Alhambra, with the famous Watch Tower, where the Christian flag was hoisted on the day of the surrender of the Alhambra by the Moors. The event is commemorated by the ringing of a bell every morning, suspended at the top of the tower, underneath which is an inscription giving an account of the capture of the place by their Catholic Majesties.

A magnificent view of the whole of the surrounding country may be had from this position,* which embraces the city with its numerous churches and the cathedral, the lovely Vega, upon

* A graphic description is given in Washington Irving's "*Chronicles of the Conquest of Granada.*"

which were originally encamped the besieging forces, where so many desperate encounters took place, and the greater part of the western chain of the Sierra Nevada range, including the two loftiest peaks, Cerro de Mulhacen, 11,781ft., and Picacho, 11,597ft. respectively above sea level.

We visited the Moorish Palace, and examined with great interest the spacious courts, the marble pillars, and the interior decorations. These are unrivalled in their gorgeous splendour and exquisite beauty of design. Passing through the Court of the Pond, a marble pavement in the centre of which is a pond with gold fish, also called the Court of the Myrtles, from the myrtles which grow along its sides, we reached the Hall of



GRANADA : THE COURT OF THE MYRTLES, ALHAMBRA.

Ambassadors, the largest hall in the Alhambra, occupying the entire Tower of Comares. The room is square, the sides being 57ft., the centre of the dome being 75ft. high, the ceiling being beautifully ornamented with inlaid work in white, blue, and gold, the designs being in the shape of circles, crowns, and stars, supposed to be an imitation of the vault of heaven. This apartment was the grand reception-room of the Sultan, the throne being placed opposite the entrance.

One of the most celebrated courts of the Alhambra, however, is the Court of the Lions. It is 116ft. in length by 66ft. in breadth, surrounded by a low gallery, supported on 124 white marble columns. The square is paved with coloured tiles, and the walls up to 5ft. from the ground are similarly



GRANADA : THE HALL OF THE AMBASSADORS, ALHAMBRA.



GRANADA : THE COURT OF THE LIONS, ALHAMBRA.

ornamented with blue and yellow tiles, with a border above and below enamelled blue and gold. The piers, arches, and pillars are extremely graceful, and are adorned with foliage, arabesques, and flagree work. The centre of the court contains the Fountain of Lions, a large alabaster basin, supported by twelve lions in white marble, through whose mouths there originally issued a considerable volume of water, falling into the basin, forming the fountain. The lions were doubtless intended as emblems of strength and courage, rather than accurate specimens of the sculptor's art.

Opposite the Hall of the Abencerrages is the Hall of the Two Sisters, so called from two very beautiful white marble slabs which adorn the pavement. They measure 15ft. by 7½ft., and are without flaw or stain.

In the Hall of Justice, the Mosque, the Boudoir of the Sultana, the extensive system of Baths, etc., are to be seen the same beauty of architecture and the same chaste and costly system of decoration. Here also may be seen the celebrated vase of the Alhambra, a splendid specimen of Moorish ceramic art, dating from 1320. It is 4ft. 3in. high, with a white ground, and enamelled in blue, white, and gold.

On the eastern side of the Alhambra, across a narrow ravine, is the Generalife, formerly a charming Moorish palace, but now belonging to Count Pallavicini, of Genoa. The terraced gardens contain an abundance of running water, and are planted with curious artificially-shaped cypress trees, and afford from some of the higher parts many beautiful views.

The cathedral at Granada, commenced in 1523, was completed in 1639. The Capilla Real, which now forms part of the cathedral, was built in 1502, and contains the tombs of Ferdinand and Isabella. On each side of the high altar kneel carved effigies of the king and queen; and in the centre of the chapel are two very beautiful white marble monuments, one of which contains the recumbent figures of their Catholic Majesties; and the other that of Juana their daughter, the mother of Charles V., and her husband Philip I. In the vault below may be seen the two coffins of Ferdinand and Isabella, of lead bound with iron, having the initials F. and Y. under a crown. In a glass case in the Sacristy may be seen the standards used at the Conquest, the sword of the king, a silver-gilt crown worn by the queen, her own missal, and a finely embroidered chasuble. The Convent of the Cartuja, some distance from the town, is very interesting, and an excellent view of it may be had from the main entrance, which is built upon a considerable eminence. The walls of the Sacristy are lined with a series of magnificent vestment chests, inlaid with Sierra Nevada marble, ebony, and ivory. The cloisters contain a considerable number of frescoes, supposed to represent the martyrdom of Charterhouse monks

under Henry VIII. during the Reformation in England. They are inferior as works of art, and are gross exaggerations.

Time would not permit our seeing much more of Granada, and, after further rambles in and about the pleasantly-wooded grounds of the Alhambra on the morning of the 10th, our special train left at noon and we reached the ship at Malaga. We found all well on board, and that our fellow-passengers had had a pleasant time at Gibraltar on the way from Cadiz to Malaga.



GRANADA: CLOISTER OF THE COURT OF THE MYRTLES, ALHAMBRA.

At Malaga we visited the cathedral, which dates from 1538, and was built upon the site of a Moorish mosque. Although massive and lofty, it is not considered to possess much architectural merit. The English cemetery, which was the first Protestant cemetery permitted in Spain, is interesting. It is profusely planted with flowers and shrubs, and kept up with considerable taste, and is used by Protestants of all nationalities. Malaga is one of the most thriving and prosperous ports in the

Mediterranean, the harbour having recently undergone extensive improvements. Nearly one-half the dues are furnished by British vessels. In addition to the produce of its extensive orange groves (some of them the finest in the world) large quantities of dried fruit, cane sugar, Muscatel and other wines are shipped. The country to the south-east for many miles is an extremely fertile vega, where, in addition to the vine, the sugar-cane and eucalyptus are cultivated.

The population of Malaga is about 120,000. Most of its leading streets are spacious and comparatively modern and are well lighted at night. There are also numerous squares or plazas, public promenades, and well-kept public gardens. From the beautiful sweep of its bay, and the clear blue sky, Malaga has sometimes been compared to Naples. The climate is one of the mildest and most equable in Europe, and is admirably suited to invalids. It is sheltered from the north, east, and west by ranges of lofty hills, and at one time was resorted to in preference to Algiers.

On the evening of the 10th we left Malaga for Algiers. We are not sorry to have a quiet day at sea, after the arduous exertions of the previous four days ashore, the rapidity of movement being a little too much for many of the passengers, some of whom suffered severely from the heat and mosquito bites.

NORTH AFRICA AND ITALY.

After a pleasant Sunday we reached Algiers, from Malaga, on the morning of the 12th, in a downpour of rain—the first since we left Tilbury. Fortunately the weather improved, and we were conducted by guides through the leading thoroughfares and squares to the cathedral, mosques, governor's and archbishop's palaces, monuments, museum, and markets, the business look of the place and cleanliness of the streets being particularly noticed by those who had not previously been there, the varied costumes of the Arab population being very conspicuous, and embracing nearly all colours, white being in the ascendant—chiefly worn by the labouring classes. As coaling operations were going on at the ship, we all lunched at the Hotel de l'Europe; the weather remaining unfavourable, the afternoon was chiefly spent in making purchases.

On returning to the ship, we found enterprising merchants deftly exposing on deck various articles for sale, such as native embroidered table covers, silk and cotton dress goods, handkerchiefs, brass and china vases, plates, silver gilt spoons, and sandal-wood boxes; nearly all of them meeting with considerable success, about one-third or one-half of the original price asked being sometimes accepted. One very persevering salesman remarked he would always sell if the transaction would leave

even one penny of profit, as the business "vos for cash down." On informing this individual I had no more money, he promptly remarked, "Allah good to you; plenty money; me only very poor, but Allah's will be done." We found him in the same place the following day, doing a steady and no doubt lucrative business, with a largely recruited stock, and numerous prompt cash purchasers.

The next morning being beautifully fine we were driven to the high ground, about six miles to the rear of the town, where we had a commanding and magnificent view of the entire town and harbour, with its extensive shipping and breakwater, the previous day's rain having laid the dust and refreshed the much-parched trees and shrubs in the neighbourhood of Algiers, which add so much to its attractiveness. They have all suffered from protracted drought during the summer.

We spend the afternoon in visiting the Jardin d' Essai, with its beautiful giant palms, bananas, indiarubber trees, and extensive rose arbours. These attractive grounds are open to the public and are supported by the State. Our return was by way of Mustapha Superior, one of the most delightful suburbs of Algiers, with numerous fashionable hotels, beautifully situated in extensive grounds. Tall and stately palms, with other tropical trees, afforded ample shelter from the sun. The well-trimmed gardens of the private houses, with lovely flowers of varied colours, was pleasant in the extreme, presenting a striking contrast to our gardens in England at this season of the year. We concluded the day by a visit to the English Church of the Holy Trinity (diocese of Gibraltar), of which Sir Lambert Playfair is a leading supporter. Before disembarking at Algiers, Sir Lambert Playfair gave us his third and concluding lecture "On Christian Slavery in North Africa," embracing the rise of Mohammedan power, an account of the daring deeds of violence committed by the numerous pirates infesting the whole of that coast—particularly Tangier, Algiers, and Tunis—from which issued fleets of these ocean pests, making captures of innocent merchant vessels of all nationalities, the crews of which were regularly sold as slaves and their cargoes confiscated.

Algiers has a population of over 50,000, and consists of an old and new portion, the latter embracing a number of fine modern streets running parallel with each other, the front of which facing the harbour is the Boulevard Republique, having a long continuous line of imposing buildings, shops, hotels, and banks, whilst the upper portion of the town, approached by a series of steep narrow streets, contains the older part with an Arab population.

We reached Tunis on the morning of the 15th, and anchored about two miles out, when we at once proceeded ashore. We were in three boats, tugged by the launch in rather a heavy

sea. Upon landing we found a long line of carriages waiting for us, and drove at once to Carthage, about two miles distant. On our way we called at the newly-erected cathedral, on an elevated mound, which was conspicuous for several miles. The cathedral was erected mainly under the auspices of Cardinal Lavigerie, and it is upon the site of an ancient temple.

About two miles further are a large number of Phœnician tombs, some of them built with masonry, having stone roofs. They are very well preserved. They are underground, some being from 20ft. to 30ft. below the present surface, and have been laid bare by a series of extensive excavations. A little beyond are the ruins of the Chapel of St. Louis, a well-preserved circular building, containing the tomb of Louis IX. of France. There is also a museum containing a numerous collection of articles from ancient Carthage, including vases, jugs, remains of marble and stone carvings, sculpture, lamps, coins, and rings, all of which have been unearthed in the neighbourhood, and many of them date from before the Christian era. The district for several miles contains traces of ruined buildings, which indicate the extent of the ancient city; but much that is valuable has been carried off and appropriated in the construction of modern Tunis, or to enrich the public buildings and museums of Europe. To the north-east of the Byrsa, which was the first fortified position erected by the Carthaginians, are a series of remains, supposed to be part of the walls of the Palace of Dido; and under the Chapel of St. Louis may be seen distinct traces of the Temple of Æsculapius, four or five small apses being still visible. Part of the waterworks of Punic Carthage are still in existence, and have been restored. These consist of a series of cisterns, eighteen in number, containing 27,000 cubic metres of water. There also are seen traces of the Amphitheatre, which was the scene of the martyrdom of St. Perpetua and her companions in 203 A.D. Traces of the Circus are also seen, and, looking towards La Goulette from the great cisterns, the ruins of the Theatre are on the left near the seashore. A long drive of several miles brought us to Tunis. We had then half-an-hour's railway ride to La Goulette, where we found the launch and boats of the ship.

The following morning we breakfasted at six o'clock. Some of us rose early to see the sun rise. It was a beautiful sight. The sun gradually appeared over Cape Bon, the eastern extremity of the Gulf of Tunis, and in little over half-an-hour the intense heat was fully in evidence. At eight o'clock we are again sightseeing in Tunis. We visited the Arab and Jewish quarters, their bazaars, the Bey's Palace, from the flat roof of which we had a magnificent view of the entire city—Carthage, La Goulette, and the surrounding hills, with the eastern sun lighting up the entire scene.

Tunis contains a population of about 125,000, of whom one-fifth are Jews and one-fifth Europeans, chiefly Maltese and Italians. The Bey is the nominal ruler, but the entire state administration is in the hands of the French, who maintain garrisons throughout the country.

The city, as a rule, is clean, orderly, and prosperous, both in the European and native portions, boasting its daily papers, trams, and telegraph offices. In the European portion the shops are large and well stocked with goods of the latest Paris fashion, the clothing in every variety admirably arranged behind stylish plate-glass windows. In the native quarters may be seen every variety of oriental goods and costumes. Sales are pushed with the greatest eagerness. This part of Tunis is thickly populated, and in places somewhat inodorous.

Tunis is connected with La Goulette (the port) by railway, the distance being about six miles. Carthage is one of the stations on the line.

ITALY.

We left for Palermo the same night, and arrived the next morning before breakfast. Palermo has had a chequered career. As *Panormus*, it dates from the Phœnicians, and until its capture by the Romans, B.C. 254, was one of the most important strongholds of the Carthaginians. It was colonised by Augustus. After passing into the hands of the Goths, it was captured by the Arabs in 830 A.D., and they made it their capital. In 1072 it was taken possession of by the Normans, and in 1193 for a short time by the Germans in the person of Henry VI. It was afterwards successively possessed by the French house of Anjou and the Spaniards, and ultimately by the Neapolitan Bourbons, when, after several insurrectionary outbreaks, it was finally captured by Garibaldi, May 27, 1860; and under Italian rule Palermo has made considerable progress, and now numbers close upon 267,000 inhabitants.

Situated on the west side of the Bay of Palermo, the city is enclosed by the fertile plain of Conca d'Oro, beyond which it is protected by an amphitheatre of imposing mountains, including Monte Pellegrino on the north, an immense mass of limestone rock rising abruptly from the sea, its peculiar shape rendering it a conspicuous object for many miles from the city.

The Cathedral, built in the twelfth century, contains the tombs of the Norman kings of Sicily and other sovereigns.

It is an imposing-looking building. Extending along the entire south front are beautifully cultivated gardens, containing palms and other tropical plants, amongst which, in addition to the numerous well-kept beds of gaily-coloured flowers, are seen,

in almost every variety of hue, the lovely coleus from four to five feet in height; their brilliantly-coloured variegated leaves and tall flower-like bracts of dazzling alternate shades render them objects of conspicuous beauty.

We visited the Palazzo Reale, founded by the Saracens on the ruins of an ancient Roman palace, with additions since made by the Normans. The central tower, with its pointed arches, is now the only portion that remains to represent the Norman period, but the entire building still retains traces of its origin as a defensive structure. The palace is extensive, but by no means elaborately furnished. There is shown the small unpretending-looking bedroom occupied by Garibaldi after the annexation of Sicily to the kingdom of Italy in 1860, with the furniture exactly as it stood upon that occasion.

After passing through the palace court and ascending a staircase on the left, we entered the Capella Palatina, where is a beautiful little chapel, rich in mosaic work, built by the Norman King Roger II. about 1132, and restored and decorated by several of his successors. The choir is approached by five steps of polished white marble. To the right is a marble candelabrum, 14½ ft. high, in Norman work of the 12th century (the four top figures having been added at a later period); the floor is inlaid with coloured mosaics; the walls of the entire building are covered with mosaics on a golden ground representing subjects from the Old Testament, the life of Christ, of St. Peter, and St. Paul.

One of the most remarkable sights in Palermo is the Convent of the Capuchins, with its immense catacombs, divided into several long galleries, containing preserved corpses of monks, nobles, women, and children, packed either in glazed coffins or wire-fronted boxes, in the costume of their rank. There are several thousands of bodies, some over 300 years old. The convent is now suppressed and interments discontinued, but on All Souls' Day many relatives and friends assemble, bringing new clothing for the dead.

About a mile and a half outside the city is the beautiful estate called the Villa Tasca, the property of Count Tasca, one of the first systematic farmers of Sicily. The drives are very extensive, the grounds being thickly planted with orange, lemon, and citron trees, forming an agreeable shelter from the hot sun. We saw some very fine double dahlias, in a variety of colours, which contrasted with the numerous tropical plants amongst which they were growing. There are also bananas, date, and other palms, oleanders, plumbago, abutilons, magnolia, tree geraniums, myrtle, and roses. In several elevated parts of the grounds small temples are erected, from which magnificent views were had. The day was clear and bright, the entire city and the harbour, with its extensive shipping, appeared to be at

our feet. The lovely deep blue water, the sky, and the green foliage of the extensive orange and lemon groves in the plain below, formed a charming picture which will not be easily forgotten.

Still ascending for about three miles further, we reached the Cathedral of Monreale. It was commenced by the Normans in 1174. It is in the shape of a Latin cross, 334ft. long and 131ft. wide, with three apses. The whole of the interior of its vast proportions is covered with mosaics, embracing an area of 70,000 square feet, and representing Scriptural subjects, from the temptation to the crucifixion; it is one of the finest specimens of this class of work produced during the Middle Ages, and may take rank with St. Mark's at Venice. In the tribune is an enormous bust of Christ in mosaic, the outline and features of which are distinctly visible at the western extremity of the building. The old bronze doors north and west, contemporary with the church, are very fine, the latter bearing an inscription of the artist A.D. 1186, the door being 15ft. to 16ft. in height. A drive we had along the fashionable parade called the Marina, extending to the south from the Porta Felice, along the sea, at sunset, completed a pleasant and agreeable day. We much regretted that our stay was so short at the beautiful city of Palermo.

On the morning of the 18th (Sunday) we passed Cape Spartivento, and made for the western side of the island of Sardinia, which was preferred by the captain to the shorter route through the Straits of Bonifacio, on account of the weather; the sea was rough, with a stiff breeze all day.

After breakfast, on the morning of the 19th, we sighted the headlands enclosing the Gulf of Ajaccio.

We anchored in the pretty little harbour of Ajaccio, and got ashore about noon. After looking through a small, unpretending-looking house in the Place Letizia, Rue St. Charles, where the great Emperor was born August 15, 1769, and strolling leisurely through the little town, arrangements were made for a drive round the outskirts. The whole of the drivers, about forty, however, declined to leave the stand unless they were paid 10 francs more than the price originally contracted for. We at once began to move off. The original terms were immediately accepted. Some of the party drove out to the castle at Pozzo di Borgo, and were most hospitably entertained by the proprietor. The castle was largely built from stones brought from the Tuileries, and the grounds and surrounding scenery are very beautiful.

Others drove out into the country about seven miles in an easterly direction. The entire district round Ajaccio is mountainous. We appeared to reach the elevated ground after an ascent of about 400ft., and much regretted to have to retrace

our steps. The mountains appear to almost entirely enclose the beautiful harbour; and, as far as the eye can reach, lofty peaks, more or less covered with trees, present themselves, many of the trees appearing to fringe even the very summits. The drive back was very enjoyable, the views from the high ground embracing the entire town, harbour, and bay—our yacht lying quietly at anchor being a conspicuous object in the distance, her stokers getting up steam for our last port of call.

We returned to the ship in the evening after making a few purchases in the town. About ten o'clock we left for Villa Franca, receiving as salutes a series of flash-lights from our kind and hospitable host from his lofty castle at Pozzo di Borgo, to which we replied with blue lights and rockets.

After a somewhat rough passage we anchor on the afternoon of the 20th for a short time in the small harbour of Villa Franca, and landed some passengers amidst numerous farewells; and on the following morning we arrived at Marseilles, where our pleasant and agreeable tour came to an end.

The following letter was sent by the Secretary to the *Manchester Guardian*, and was inserted in that paper:—

THE LATE BISHOP OF LIKOMA (CHAUNCY MAPLES).

DIED SEPTEMBER 12TH, 1895.

"Some days ago you published a telegram to the effect that Bishop Chauncy Maples, while on his way to Likoma, had, with a companion, been drowned in Lake Nyassa by the upsetting of a small boat. This news has been confirmed, and any lingering hope that there might have been some mistake in the first message must now be abandoned. No nobler result of the efforts of Dr. Livingstone at Oxford and Cambridge on behalf of a mission to the African by graduates of the Universities than Chauncy Maples can be named. Educated at the Charterhouse and at University College, Oxford, he took his degree in 1875. He became for a time a lay reader at St. Luke's, Liverpool, where he took deacon's orders the same year, and was appointed curate of St. Mary Magdalene, Oxford. He stayed there but a short time, and went to Zanzibar, where he was ordained priest by Bishop Steere in 1876. In his case he responded to the calls of Livingstone, Sedgwick, Gladstone, and others, who, in founding the Universities' Mission, asked for the best. He never wavered in his love for his work, nor shrank from any sacrifice it demanded. He remained at Kiungani (Zanzibar) for fourteen months, and in 1877 was sent by the Bishop to Masasi, where, and at Magila and the neighbourhood, he worked hard in a difficult position until

1886. This country was in the early days severely raided by the Magwangwara. He bravely remained in this threatened district, and gained great influence over the people. There are now two important stations in this part of the German territory, while they were a kind of no man's land at the beginning of his time. In 1886 the great desire of his heart was accomplished, the Bishop (Smythies) sending him to the lake to join his brave college friend, Rev. W. P. Johnson, who had gone on some time before. Here he laboured, devoting himself with all his might to teaching, preaching, and organising. He mastered the language, and became an authority on its philology. He studied the geological formation of the district, and made the botany and natural history of the Lake, of Yaoland, and of the Rovuma district known to the civilised world. In the midst of abundant labours, whilst those who went out to help fell on the right hand and on the left, he kept his health, and wrote many valuable communications, which will now be greatly treasured. He was the first to find the Royal Fern, nearly on the top of some of the mountains in Yaoland, where no other European had been. He taught the people agriculture, building construction, brick-making, and iron-working; he organised schools for boys and girls. It was with a merry twinkle in his eye he gave a description of his lessons in sewing to some Nyasa girls. He could not get them to draw the needle towards themselves—they would thrust it from them; and when the ladies afterwards took charge of the girls' school (much to his relief) they thought that practice was the fault of the instructor, and only learned by experience that it was a native habit which could not be cured. His description, too, of the first native Christian marriage was full of humour. He was host, and had promised the wedding breakfast, which he supplied, finding, to his dismay, that it lasted a week, for all the relatives of the young couple who attended. He never repeated the experiment. When Bishop Smythies laid down his burden every eye was turned to Mr. Maples, who had been already appointed archdeacon, and it was felt that here was a man who had been especially prepared for the office. His gracious and loving spirit had been trained in a school of hard experience, and to his natural gifts and literary training had been added a great widening of view, and a statesmanlike grip of the surroundings and of the position in the Lake country. The friends of the African and of the Mission were delighted when, a very short time ago, he was consecrated, in succession to Mackenzie, Steere, Smythies, and Hornby, Bishop of Likoma (the island which had been kept in the British sphere, and where the centre of his work lay); and now we hear the sad news that all this preparation goes for naught, and these high hopes are dashed to the ground. We shall no more hear such a delightful address as he from time to time has given in this city on the country and his work. None of those who heard him at Owens College this year will ever forget the speaker or his address. He was one of the earliest members of the Manchester Geographical Society, and the Society was always ready to give him a most hearty welcome on his visits to the city. He remarked more than once that his reception by the Manchester Society was so hearty that it was an inspiration to him, and helped him greatly in his work. He kept up a constant correspondence with the Society, and we never forgot him—the kindly and courageous soul, the generous friend, the happy companion, the accomplished traveller and scholar—at Likoma."

THE
MANCHESTER GEOGRAPHICAL SOCIETY.

RULES.

I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be :—

1. To further in every way the pursuit of the science; as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.
2. To hold meetings at which papers shall be read, or lectures delivered by members or others.
3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.
4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.
5. To inquire into all questions relating to British and Foreign colonisation and emigration.
6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.
7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.
8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.
10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence), and twenty-one Councillors.
11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.
12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months from the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

IV. PAYMENTS.

18. Any ordinary member shall pay an annual subscription of £1 1s., or he may compound by one payment of £10 10s. An associate member shall pay an annual subscription of 10s. 6d. The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

ORDINARY MEETINGS.

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of proceedings shall be as follows:—

- (a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.
- (b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.
- (c) The election of new members to be declared and the names of candidates to be read.
- (d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest, the Council may make provision for a larger admission of visitors.

ANNUAL MEETINGS.

30. The Annual Meeting of the members shall be held at such time and place as the Council shall determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

SPECIAL GENERAL MEETINGS.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

VI.—COUNCIL AND OFFICERS.

THE COUNCIL.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman.

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committees shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

PRESIDENT AND VICE-PRESIDENTS.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

CHAIRMAN OF THE COUNCIL.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and Officers, and to summon, when necessary, special meetings of the Council and of Committees.

TREASURER.

45. The Treasurer has the charge of all accounts ; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by two members, who shall be elected at an ordinary meeting at least one month before the Annual Meeting.

SECRETARIES.

49. The duty of the Honorary Secretaries shall be :—

- (a) To conduct the correspondence of the Society and of the Council.
- (b) To attend the meetings of the members and of the Council, and minute their proceedings.
- (c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting ; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.
- (d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

The foregoing Rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894.

(Signed)

GEORGE, *President.*

S. ALFRED STEINTHAL, *Chairman.*

F. ZIMMERN, *Honorary Secretary.*

JAS. D. WILDE, M.A., *Honorary Secretary.*

ELI SOWERBUTTS, *Secretary.*

[COPY.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895.

E. W. B.

MANCHESTER GEOGRAPHICAL SOCIETY.

VICTORIAN LECTURES.

A body of gentlemen known as the "VICTORIANS," composed of Members of the Council and other prominent Members of the Society, all Geographical experts, freely *GIVE* their services as Lecturers. This is done with a view of increasing the usefulness of the Society, and to spread reliable Geographical information. The Lectures are given in a popular manner, and are a valuable educational influence in Manchester and the surrounding districts, and are much in demand.

TERMS FOR LECTURES.

The terms upon which these Lectures are delivered are as follows:—

Any Member of the Manchester Geographical Society, or any Affiliated Society, is entitled to make application for "Victorian" Lectures during the Session.

The Lectures must be advertised as by Mr. —, a "Victorian of the Manchester Geographical Society."

The services of the Victorians are *gratuitous*, but to meet the necessary expenses of carrying on the work a small fee for each Lecture is charged, and Railway Fares, Lantern Hire and Carriage, Hire of Slides, and other special expenses, when incurred.

Lectures by the Victorians for others than Members, or Affiliated Societies, can only be given sparingly, and will be charged from £2 2s. for each Lecture, with the addition of travelling and lantern expenses.

Any balance left out of these charges, after paying the expenses incurred, is applied to the repair and upkeep of the lantern, and the making of new slides. The Society's Lantern is NOT lent unless a "Victorian" Demonstrator accompanies it.

Applications for Lectures, or for any information, should be made to the Hon. Secretary, "Victorians," at the Offices of the Society, 16, St. Mary's Parsonage.

The "Victorians" will be glad to arrange Lectures, to form a series, for Technical or Continuation Schools.

The "Victorians" offer the following Lectures to the Members and Affiliated Societies:—

- | | |
|---|--|
| 1. Physical Geography. D. | 34. A Short Tour through Sweden (Gota-canal). L. |
| 2. The Life and Work of a River. D.L. | 35. Madeira and the Canary Islands. L. |
| 3. The Making of Mountains. D.L. | 36. India: The Geography of the Country. D.L. |
| 3A. Landscape Making. L. | 37. India: The People, Their Customs and Manners. L. |
| 4. Elements of Map Projection. D.L. | 38. India: The Antiquities. L. |
| 5. Maps, and How to Read Them. D. | 39. Ceylon, "The Pearl of the East." L. |
| 6. Commercial Geography. D. | 40. A Peep at the Land of the Rising Sun. L. |
| 7. The Circle of Geographical Sciences. | 41. Palestine: Old and New. D.L. |
| 8. The Obligation of Geography to Missionaries. D. | 42. The British in South Africa. L. |
| 9. The Battlefields of Europe. D.L. | 43. British Central Africa (Nyassaland). L. |
| 10. A Thousand Years of Hungarian History. L. | 44. British East Africa. L. |
| 11. The Balkan Peninsula. D. | 45. The Uganda Protectorate. D.L. |
| 12. The Mediterranean: A Study in Comparative Geography. D.L. | 46. The Great Lakes of Central Africa. D.L. |
| 13. The Rhine from Source to Sea. L. | 47. The Commercial Products of Central Africa. |
| 14. A Peep into Switzerland. L. | 48. The Congo: Its Discovery and Exploration. D.L. |
| 15. Notes of Journeys through Switzerland. L. | 49. Across Africa with Stanley. L. |
| 16. Naples and Pompeii. L. | 50. The Nile and its Story. D.L. |
| 17. Old and New Rome. D. L. | 51. Egypt and its Monuments. L. |
| 18. A Scamper through Italy. L. | 52. Canada. D.L. |
| 19. A Cruise in Dutch Waters. L. | 53. The Great North-West. D. |
| 20. Manchester: Historical and Geographical. D.L. | 54. Across the Rocky Mountains. L. |
| 21. Oxford: The Colleges and College Life. L. | 55. Chicago, and a Visit to Niagara. L. |
| 22. Westward Ho! L. | 56. From New York to San Francisco. L. |
| 23. West Wales (Devon and Cornwall). L. | 57. Australia: Its Discovery and Exploration. D.L. |
| 24. Dear Old Devon. L. | 58. Australia: The Development and Present Condition. D.L. |
| 25. The Scilly Islands. L. | 59. A Trip to the Antipodes. D. L. |
| 26. Some English Cathedrals. L. | 60. Greenland. D. |
| 27. The Norfolk Broads. L. | 61. Polar Exploration (North and South). L. |
| 28. The Isle of Skye. L. | 62. Recent Attempts to Reach the North Pole. L. |
| 29. The Shetland Isles. L. | 63. Nansen and the North Pole. L. |
| 30. Through Connemara with a Camera. L. | |
| 31. A Tour in Normandy. L. | |
| 32. Venice, Past and Present. L. | |
| 33. Genoa the "Superb." L. | |

A number of other subjects are in preparation; particulars can be obtained from the Hon. Sec. of the Victorians.

The letter L means lantern wanted for slides. The letter D means diagrams or maps are used. It will be observed that some lectures are given with either, as may be required.

LIST OF MAPS, BOOKS, JOURNALS, &c.,

ACQUIRED BY THE SOCIETY FROM JANUARY 1st TO DECEMBER 31st, 1895.
NOW IN THE LIBRARY.

With an indication of the maps and principal papers in the Journals.

MAPS.

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The World, showing Religions and also Stations of the London Missionary Society. Compiled and Published for the London Missionary Society by George Philip and Son, London and Liverpool, 1895. * The Publishers.

The Neotropical Region, showing its Division into 4 Sub-Regions. "The Geography of Mammals." London : Royal Geographical Society, 1895. * The Society.

New Cycloidal Projection, devised and employed by the late Lt. Colonel Thomas Best Jervis, F.R.S., F.A.S., F.R.G.S., Bombay Engineers, Founder and Director of the Topographical and Statistical Depot, War Department, London (now the Intelligence Office), by which entire continents may be represented with the least distortion of any projection hitherto known. * G. Jervis, Esq., F.G.S., Turin.

EUROPE

Bowles's New Pocket Map of England and Wales, with the addition of New Roads and other Improvements, by Daniel Paterson. Engraved by J. Ellis. Published by C. Bowles, London, January, 1788. * C. Roeder, Esq.

Road and Railway Map of Suffolk, coloured. London : Jarrold and Son.

New Map of Suffolk, reduced from the New Ordnance Survey, by J. Bartholomew, F.R.G.S. Scale: 2 miles to the inch. London : Jarrold and Son.

Street Map of Cambridge. London : Jarrold and Son.

Norway. Topographical Map of Norway. Scale 1/100,000. Sheets 1 D, 2 C, 5 AE, 6 AE, 7 Z, 7 AE, 9 A, 18 I. * Norges Geografisk Opmaaling.

Norway. Geological Map. Scale 1/100,000. Sheet No. 31. * Norges Geografisk Opmaaling.

Norway. Coast Charts. Scale 1/50,000. Sheets B 8, B 9, B 46. * Norges Geografisk Opmaaling.

Botanical Map of Upsala District, 1820. * Geological Institution, University, Upsala.

Schweiz. Bearbeitet von F. Handtke und A. Herrich. Scale 1/600,000. Carl Flemming's General-Karten, No. 21. Druck und Verlag von Carl Flemming in Glogau. * The Publisher.

Western Switzerland, with Jura-Simplon Railway. Scale 1/400,000. London : Jura Simplon Railway Co., 1895. * The Company.

Italy, showing Railroads. London to Italy, South Italian Railway, Adriatic Lines.

ASIA.

- Dhofar, and the Gara-Range, from a survey by Iman Sherif, Khan Bahadur. With Mr. J. T. Bent's Route. *Royal Geographical Society.
- The adjoining Russian, Chinese and Japanese Possessions in Eastern Asia. Compiled in the Intelligence Division, War Office, February, 1895. Scale 1/4,118,400, or 65 miles to 1 inch. *The Director of Military Intelligence.
- Kartenskizze zur Uebersicht der Chinesischen Zukunfts-Eisenbahnen. Amsterdam J. H. de Bussey. *E. Sutton, Esq.
- The Luchu Islands, to illustrate Mr. Basil Hall Chamberlain's Paper (Reduced from the Japanese Admiralty Chart by Mr. B. V. Darbishire). Scale 1/4,000,000, or 64 miles to 1 inch. Published by the Royal Geographical Society, 1895. *The Society.
- The Siamese Malay States, with Trade Routes. 1/5,000,000. Northern Portion Enlarged. 1/1,000,000. To illustrate Mr. H. W. Smyth's Paper. *The Royal Geographical Society.

AFRICA.

- Mr. W. B. Harris's Routes between Morocco and Tafilet. Scale 1/1,000,000, or 15.75 miles to 1 inch (Compiled by Mr. B. V. Darbishire). Published by the Royal Geographical Society, 1895. *The Society.
- Carte du Sahara et du Nord-Ouest de l'Afrique de la Méditerranée au Sénégal et au Lac Tchad. Dressée par P. Vuillot. Echelle, 1/4,000,000. Dessiné et Gravé par R. Hausermann. Paris: Imp. Vieillemand et ses Fils. *P. Vuillot, Esq.
- Regions Meridionales de la Guinée et du Soudan Français. 1/500,000, dressée par M. le Capitaine Levasseur. Paris: Le Service Géographique des Colonies, 1895. *M. le Ministre des Colonies par M. le Prof. C. Guy (Chef du Service Géographique).
- Plans of the Town and Environs of Timbuctoo. On Scales 1/16,000, 1/200,000, 1/1,000,000, &c., Drawn by P. Vuillot. "Extraits des Comptes Rendus des Séances de la Société de Géographie," Paris, 1894. *The Author.
- Côte d'Ivoire, au 1/150,000. Par H. Pobéguin, Administrateur Colonial. 4 Feuilles—Grand Lahou, Thiassalé, Ouosso et Toumodi. Paris: Le Service Géographique des Colonies, 1895. *M. le Ministre des Colonies, per M. le Profr. Camille Guy (le Chef du Service Géographique).
- Gold Coast Colony and Neighbouring Territories. Scale 1/506,880, or 8 miles to an inch. Intelligence Division, War Office, No. 1097. (Published on behalf of the War Office by E. Stanford.) *The Director of Military Intelligence.
- Borgu and Adjacent Southern Territory, with Captain Lugard's Route, 1894-5. *The Royal Geographical Society.
- Carte du Congo Français. 1/1,500,000. Notice et Index Alphabetique. Service Géographique des Colonies. Paris, 1895. *Le Service Géographique des Colonies.
- Carte de l'Etat Independent du Congo, dressée d'après les itinéraires originaux des Agents de l'Etat et des autres voyageurs. Par J. du Fief, Secrétaire général de la Société royale belge de Géographie. Echelle = 1/2,000,000. En quatre feuilles. *Professor J. du Fief.
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- British Central Africa Protectorate, prepared from a drawing compiled at the Intell. Div., War Office, for H. H. Johnston, C.B. Scale 1/1,500,000, or 1 inch = 24 miles. Published by the Royal Geographical Society, 1895. *The Society.
- British Central Africa. (Blantyre District Sheet.) Scale 1/253,440. Lithographed at the Intelligence Division, War Office, London, March, 1895. No. 1092 (h). *The Director.
- Central East Africa, 1/2,000,000, with Mr. G. F. Scott Elliot's Routes. *The Royal Geographical Society.

- Rough Road Chart of Sabakhi Route from Makangeni to Machacos, 1890, by Captain F. D. Lugard with the assistance of Mr. George Wilson. Reproduced at the Intelligence Division, War Office, August, 1890. Scale 1/255,440, or 4 miles to an inch. * The Imperial British East Africa Co., Ltd.
- Uganda and Adjoining Territories. Compiled for the Intelligence Division, War Office, by Captain J. R. L. Macdonald, R.E., August, 1894. Scale 12 miles to 1 inch, or 1/760,302. No. 1075. (Published for the War Office by E. Stanford, 1895. 3s.) * The Director of Military Intelligence.
- Ruwenzori. 1/500,000. With G. F. Scott Elliot's Routes. * The Royal Geographical Society.
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- Nile Provinces from the Third Cataract (Hannek) to Khartum. Scale 16 miles to 1 inch, or 1/1,013,760. Compiled and Lithographed at the Intelligence Branch, War Office. No. 381. * The Director of Military Intelligence.
- Map of Madagascar. Compiled in the Intelligence Division, War Office. Scale 1/3,000,000, or 47.3 miles to 1 inch. Intelligence Division, War Office, No. 1084. Published on behalf of the War Office by E. Stanford, 1895. Price 2s. 6d. * The Director of Military Intelligence.
- Parts of the West Coast of Madagascar, illustrating Mr. J. T. Last's Journeys. Two Maps. * Royal Geographical Society.

AMERICA.

- The Labrador Peninsula, to illustrate paper by A. P. Low, B. Ap. Sc. London : Royal Geographical Society, 1895. * The Society.
- Part of British Guiana and Venezuela. Scale 1/1,500,000, or 23.67 miles to 1 inch. (Mr. B. V. Darbishire.) Published by the Royal Geographical Society, 1895. * The Society.
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- Peru. By A. Raimondi. Sheets 1 to 16. Scale 1/500,000. Published by the Geographical Society of Lima. * Sociedad Geografica de Lima.
- Lago Titicaca, plano formado sobre los trabajos de Pentland, Raimondi, Agassiz. Por Rafael E. Baluarte, Cartógrafo de la Sociedad Geografica de Lima; colaborador y dibujante del Mapa Oficial del Peru del Profesor Sor A. Raimondi, 1893. * Sociedad Geografica de Lima.

OCEANIA.

- British New Guinea and Solomon Islands. Royal Geographical Society, London, 1895. (80 Copies for use at Sir Wm. Macgregor's meeting.) * The Society.

ATLASES, &c.

- The Castle Line Atlas of South Africa, with an Account of the Geographical Features, the Climate, the Mineral and other Resources, and the History of South Africa. 30 Maps and Diagrams, and Index of over 6,000 names. London : D. Currie and Co., 1895. * The Publishers.
- Twenty-four Photographs, near the Source of the Mississippi River, Minnesota, U.S.A., to illustrate paper by Hon. J. V. Brower, on "Prehistoric Man at the Headwaters of the Mississippi." * Hon. J. V. Brower.

Plans of the Most Important Cities and Towns of Continental Europe, accompanying the special edition of Bradshaw's Guide and General Handbook. 28 Plans.
* F. Curzon, Esq.

Bows and Arrows from Brazil, Banks of River Amazon. * F. Zimmern, Esq.

Two coloured Photos, near St. Gothard Tunnel. * J. J. Gleave, Esq.

BOOKS.

GENERAL.

Presented by the University Library, Upsala, through the Geological Association.
Upsala Universitets Arsskrift ; Matematik och Naturvetenskap, 1870, 1872, 1873, 1874, 1875.

The Algæ of the Arctic Sea, by F. R. Kjellman (with 31 plates), 1883.

Ueber die Algenvegetation des Murmanschen Meeres an der Westküste von Nowaja Semlja und Wajgatsch, von F. R. Kjellman (with 1 plate), 1877.

Agronomiskt-Växtfysiognomiska Studier i Jemtland. Af E. Henning, 1889.

Om Vegetationens Utveckling i Sverige Aren, 1873-75. Af H. W. Arnell.

Ibn Batûtahs Resa Genom Maghrib. Af H. Almquist, 1866.

Bidrag till Utvandringsfragan fran Befolknings-statistisk Synpunkt. Af G. Sundbärg, 1885.

Om de Lösa Jordaflagringarna i nagra af Norrlands Elfdalar. Af T. Fergræus, 1890

Studier öfver Baltiska Hafvets Qvartära Historia, 1. Af H. Munthe, 1892.

Ueber die Thätigkeit der Schlammvulkane in der Kaspischen Region während der Jahre 1885-87. Von Dr. Hj. Sjögren.

Beiträge zur Geologie des Berges Savelan im nördlichen Persien. Von Dr. Hj. Sjögren.

Ueber die Salixflora der Jenissej-Ufer. Von Dr. A. N. Lundström.

Om och Ur den Arabiske Geografen Idvisi. Af R. A. Brandel, 1894.

Carl Linnaei resa till Lappland, 1732. Af A. N. Lundström.

Redogörelse för Prävens färd fran Dicksons hamn till Norge Samt för Kariska hafvets växt och djurverld. Af F. R. Kjellman.

Bestämning af Upsala Observatorii Polhöjd, af Gustav Ericsson, 1885.

Der Ausbruch des Schlammvulcans Lok-Botan am Kaspischen Meere. Von Dr. H. Sjögren, 1887.

Ueber das diluviale, aralokaspische Meer und die nordeuropäische Vereisung. Von Dr. H. Sjögren, 1888.

Bericht über einen Ausflug in den Südöstlichen Theil des Kaukasus, 1889. Von Dr. H. Sjögren.

Übersicht der Geologie Daghestans und des Terek-Gebietes. Von Dr. H. Sjögren, 1889.

Projets de Construction d'un Globe Terrestre à l'échelle du Cent-millième. * M. Elisée Reclus.

Application simultanée et parallèle du Système Décimal à la Mesure des Angles et du Temps. Rapport par J. de Rey-Pailhade à la Société de Géographie de Toulouse, 1895. * The Author.

Notice de M. H. de Sarrauton sur l'Application du Système Décimal à la Mesure du Temps et des Angles. Oran: Société de Géographie et d'Archéologie, 1895.
* The Society.

- Is the Earth a Planet? A Study in Physical and Mathematical Geography. By C. Robertson, M.D., M.R.S.G.S. * The Author.
- Geographical Methods. A Chapter of Suggestions. By A. Montefiore, 1895. Price 6d. * The Author.
- Short Studies in Nature Knowledge; an introduction to the Science of Physiography. By Wm. Gee. London: Macmillan and Co., 1895. * The Author.
- Information relative to the Collection of Geological Photographs, and Hints as to the Selection of a Suitable Camera. Issued by the Geological Photographs Committee, British Association for the Advancement of Science, No. 6, 1895. * The Committee.
- Volcanoes: Past and Present. By E. Hull, M.A., F.R.S. Illustrated. 270pp. London: Walter Scott, Ltd., 1892.
- The Continuity of the Palæolithic and Neolithic Periods. By J. Allen Brown, F.G.S., &c. * The Author.
- Les Monnd-Builders, une Monographie. Par le Marquis de Nadaillac. 93pp. Louvain: Polleunis and Ceuterick, 1895. * The Author.
- The Story of the L.M.S., 1795-1895. By C. S. Horne, M.A. 444pp. With Maps and Illustrations. London: London Missionary Society, 1894. * The Society.
- Colonization and Christianity: Popular History of the Treatment of Natives by Europeans in their Colonies. By Wm. Howitt, London: Longman and Co., 1838.
- Sixth International Geographical Congress, London, 1895. Bound Collection of Papers, Reports, Journals, Exhibition Catalogue, &c.
- Sixth International Geographical Congress, London, 1895. "General Arrangements for the Meeting."
- "Knowledge," Illustrated Magazine of Science, No. 119, September, 1895, containing Report of Proceedings of the International Geographical Congress, London, 1895. * The Publishers.
- The Geographical Congress and Geographical Education. By C. Robertson, M.D., Edinburgh. * The Author.
- United British Women's Emigration Association. Report for 1894.
- Supplement to the Year-Book of the Imperial Institute. A Statistical Record of the Resources and Trade of the Colonial and Indian Possessions of the British Empire. London: Imperial Institute, 1895. * The Imperial Institute.
- Scheme for Imperial Federation; Senate for the Empire. Three Articles reprinted from "The Westminster Review" of 1879, with additions. 116pp. By G. C. Cunningham, of Montreal, Canada, with an Introduction by Sir F. Young, K.C.M.G. London: Longmans, Green, and Co., 1895. * The Publishers.
- Treaty between Great Britain and the Republic of Colombia for the Mutual Surrender of Fugitive Criminals. Colombia No. 1 (1890) [C-5902]. * Mr. J. Howard Reed.
- "Per Mare." F. T. Jane's Illustrated Naval Annual, No. 1, July, 1895.
- Sur la Densité et l'Alcalinité. Par J. Y. Buchanan. Académie des Sciences, Institut de France. * S. A. S. Prince Albert de Monaco.
- Sur les Premières Campagnes Scientifiques de la "Princesse-Alice," par S. A. S. le Prince Albert de Monaco. Académie des Sciences, Institut de France, 1895. * The Author.
- Sur la Deuxième Campagne Scientifique de la Princesse Alice, par S. A. S. Albert 1er, Prince de Monaco. Institut de France, Académie des Sciences, 1895. * The Author.
- Meteorology at the Seaside. By Surgeon Major W. G. Black, F.R.M.S., etc., Diagrams. * The Author.
- Voyages and Travels of Lord Brassey, K.C.B., K.C.I., from 1862 to 1894. In 2 volumes. Arranged and Edited by Capt. S. E. Wilmot, London: Longmans, Green and Co., 1895. * The Publishers.
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- In Memoria di Carlo Piaggia. Per Dr. Bonola Bey. Lucca, 1895. * The Author.
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- The Discovery of Elephas Primigenius associated with Flint Implements, at Southall. By J. Allen Brown, F.G.S., &c. *The Author.
- East Anglian Handbook for 1887. *Mr. Eli Sowerbutts.
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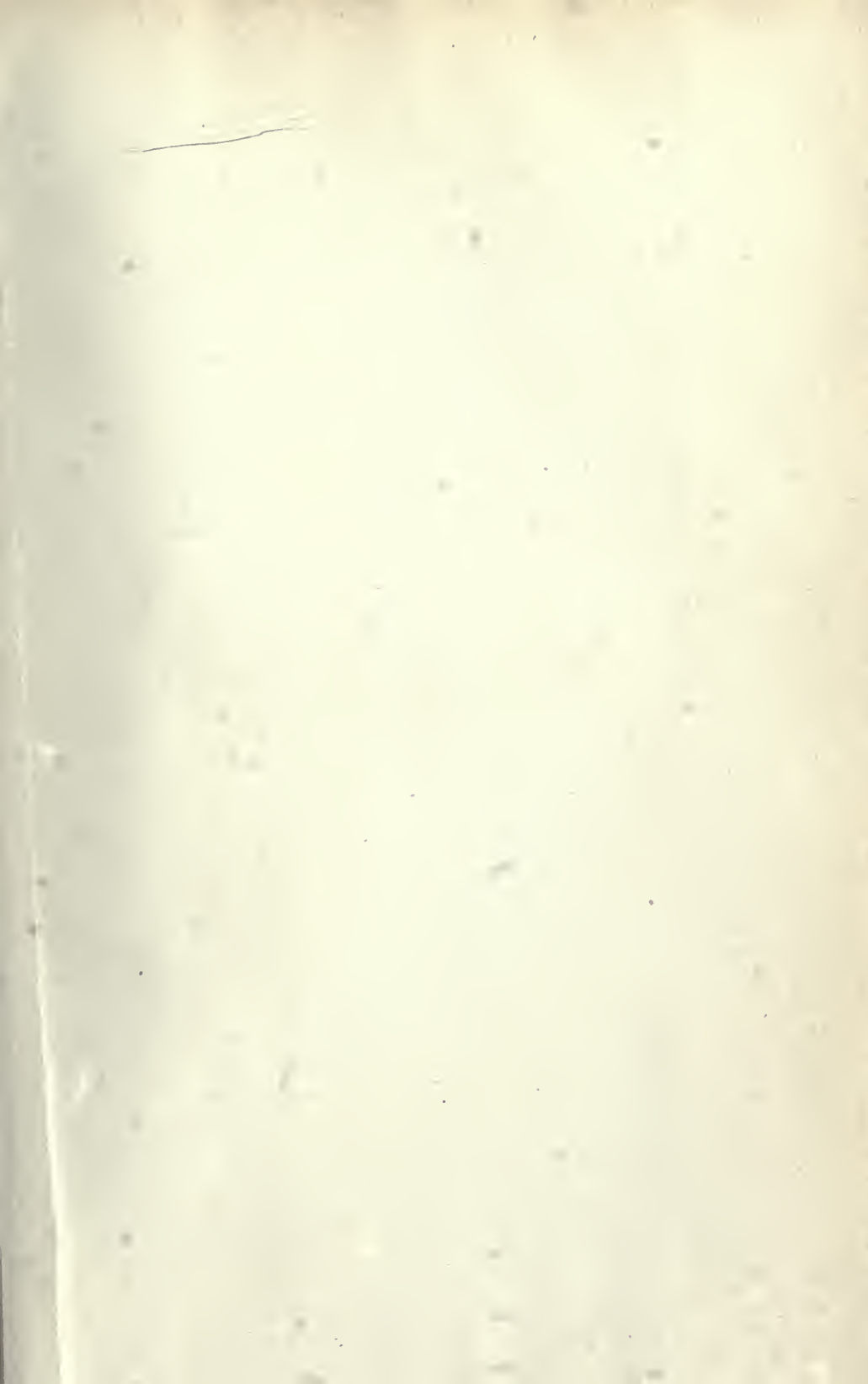
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